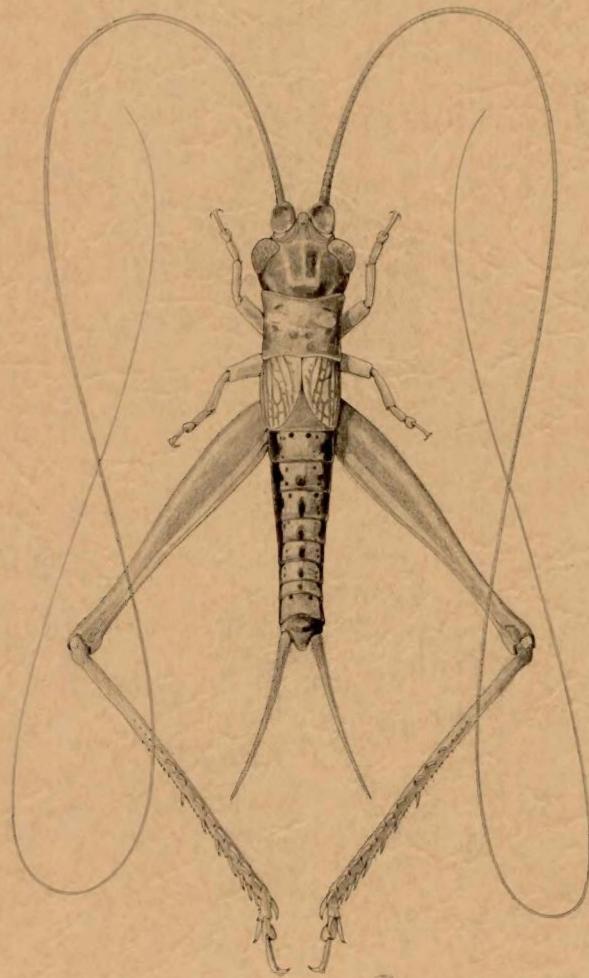


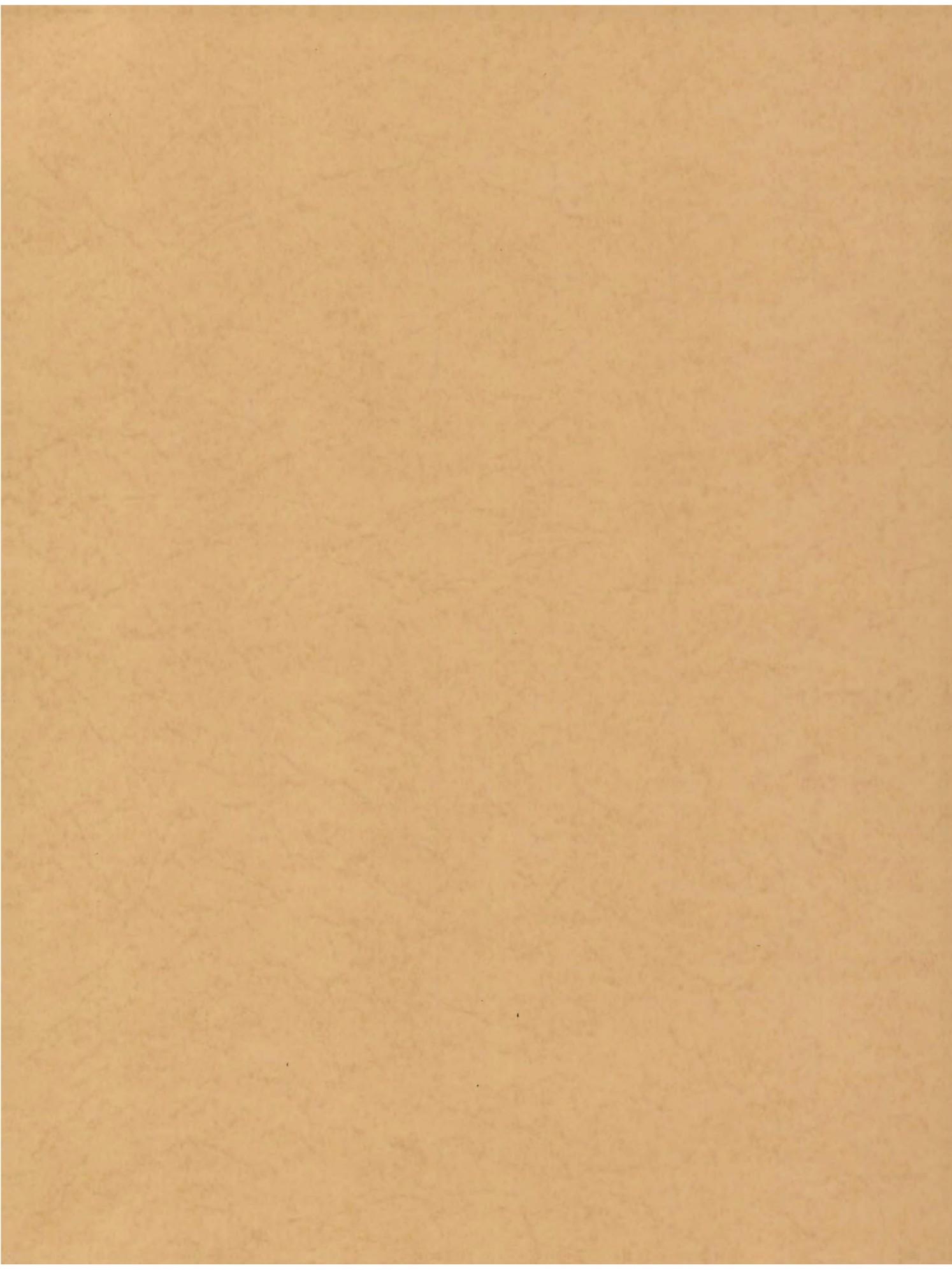
ISSN 0096-7750

**THE AUSTRALIAN CRICKETS
(ORTHOPTERA: GRYLLIDAE)**



**DANIEL OTTE
RICHARD D. ALEXANDER**

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA—1983 MONOGRAPH 22



THE AUSTRALIAN CRICKETS (ORTHOPTERA: GRYLLIDAE)

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MONOGRAPH 22

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA
19th AND THE PARKWAY
PHILADELPHIA, PENNSYLVANIA 19103

MONOGRAPH 22
THE ACADEMY OF NATURAL SCIENCES OF PHILADEPHIA

1983

**Published January 18, 1983
ALLEN PRESS, INC., LAWRENCE, KANSAS 66044**

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INTRODUCTION

The Australian crickets have not been well studied either biologically or taxonomically. Chopard's (1951) monograph, based on European collections and material sent to him from the collections at Adelaide, Sydney, and Brisbane, is the only comprehensive treatment, and Tindale's (1928) paper on mole crickets is the only biological-systematic effort by an Australian. Except for a series of publications on the two economically important field crickets, *Teleogryllus commodus* and *T. oceanicus*, little has been done since Chopard's and Tindale's work.

The present work began with twelve months of field work in Australia between June 1968 and June 1969. During approximately 46,000 miles of travel we obtained data at about 905 different localities, and visited all of the major Australian collections. Material in the European museums was examined by R.D.A. during the last three weeks of July on the return trip to the United States and many types were borrowed later. The National Insect Collection at Canberra subsequently sent their entire collection of crickets for further study and the University of Queensland sent us a major part of their collection.

Chopard (1951) and Tindale (1928) together list a total of 130 nominal species and infraspecific forms of Gryllidae from the Australian continent, six species known only from nearby islands, three species from Lord Howe Island, two from Norfolk Island, one known only from Tasmania, and two from islands in the Torres Straits. These 144 species they arranged in 54 genera and 13 of the 15 generally recognized cricket subfamilies; only the Pteroplistinae and the Scleropterinae are unknown in Australia. Tindale also includes one New Zealand species in the ten he discusses, and Chopard includes a species known only from the Solomon Islands, three from New Guinea, and one he thinks should occur in Australia, for a total of 150 species discussed by both authors.

In this work we include 492 species of which 376 are new. These species are arranged in 85 genera of which 41 are new. Fourteen previously published names are synonymized and 17 names are treated as *nomina dubia*. We were unable to locate examples of the Cachoplistinae and suggest that the

previous record was erroneous. Two previously accepted generic overlaps between South America and Australia, the burrowing genus *Anurogryllus* and the field cricket genus *Eugryllodes*, are evidently errors; neither genus is found in Australia.

We naively expected to find no more than 50 new species in Australia and supposed that we would be able to do much behavioral work. Only a few weeks in northern Queensland, however, revealed that the number of unknown species was astonishingly large. Accordingly it was necessary to forego intensive behavioral work to carry out the systematic survey we considered our primary goal. Chopard (1951) suggested quite logically on the basis of numbers of known species in each region that the fauna of Queensland was well understood, while that of southwestern Australia scarcely touched. But we found that the vast majority of undescribed species were living in rain forests and other habitats of Queensland, while fewer than a dozen species exist in the cool, relatively moist regions of extreme southwestern Australia.

We expect that we are treating at least 75% of the Australian cricket fauna here. We base our confidence chiefly on our methods of collecting. First, we have worked in the field extensively, and we have examined essentially all Australian crickets in collections. Second, we have worked chiefly at night, and for all of the singing species we have continually used the songs to help us locate and distinguish species. One can listen to, and distinguish, a large number of songs at the same time, thereby quickly sampling in a very extensive fashion the populations in a given locality; and new or unusual songs can generally be recognized promptly and without difficulty. Our confidence is necessarily lower for nonacoustical species. Third, we have examined the rates at which we found new and previously known species in both new and previously worked areas in Australia during our year of field work there. These curves also indicate that we have located a high proportion of the species, particularly in the acoustical groups. Finally, we located in the field more than 90% of the valid species described before we began our work. These species should have been the easiest to locate, although it must be kept in mind that our collecting

methods were probably quite different from those employed by earlier workers, all of whom took crickets chiefly while searching for other kinds of insects.

In spite of these remarks, this study can only be viewed as a most preliminary sort of introduction to the cricket fauna of Australia. We have dealt scarcely at all with the offshore islands; our distribution maps and biological information are sketchy for nearly all of the species we have discussed; and in spite of the effectiveness of using songs to locate and distinguish species, we have certainly missed finding many undescribed species; thus, about 70 new species were found in collections after the field work, and about 50 sounds were taped that have not been attributable to any of the species we collected.

Although it seems unprofitable to speculate on the number of species remaining undescribed, there must be many more than we had anticipated would be the case when the study was begun. First, the continent contains many more species than anyone had expected. Second, we located additional species on nearly every night of field work, often in places we had already worked once or twice before. Third, we were not always able to employ all of the various methods necessary to locate all kinds of species in each locality, nor could we work both day and night in each place. Fourth, we often found new species through chance occurrences of an unlikely nature where we had not even suspected that additional species occurred—such as a cricket landing on our clothes, seen on a high leaf as we searched for something else, or found only along a road taken on a whim. Fifth, we were able to work only during relatively short periods in any locality, and only rarely during more than part of one season. In particular, we worked scarcely at all during the wet season in northern Australia, although this must be the time when most cricket species are abundant there as adults. Finally, Australia has so few roads that vast regions were essentially inaccessible to us, particularly in the Central Desert and the Northern Kimberleys. Other areas were unexplored because of time limitations.

To attempt a systematic monograph is a frustrating and tantalizing chore. Yet that is essentially what we have had to do here. We have identified many problems that can only be solved by field

work across a longer period of time with the kind of background information we now possess.

ACKNOWLEDGMENTS

Funds for this project were supplied by a National Science Foundation grant (GB7253), a John Simon Guggenheim Foundation Fellowship awarded to R. D. Alexander, The University of Michigan Museum of Zoology (and the Frank Ammerman Fund), and the Academy of Natural Sciences of Philadelphia. Some field equipment, including a Nikon 35 mm camera and accessories, and Nagra Tape Recorder, were available from National Science Foundation grants awarded previously to Alexander. A Wild Dissecting Microscope and camera lucida, a Uher Tape Recorder, and a Bolex Super-Eight Movie Camera were provided for use in Australia by The University of Michigan Museum of Zoology. Most other field supplies and equipment, including a long wheelbase Land Rover, were purchased through the National Science Foundation grant mentioned above.

We are indebted to the following institutions and their curators for making their collections available, in some cases for loans of material, and for kindly seeing to our wants during work there: Australian Museum, Sydney (AM); Australian National Collection, Canberra (ANC); Aola Richards Collection, University of New South Wales (ARC); British Museum of Natural History, London (BM); Bishop Museum, Honolulu (BISH); Muséum d'Histoire Naturelle, Geneva (GM); Muséum National d'Histoire Naturelle, Paris (PM); Queensland Museum, Brisbane (QM); Naturhistoriska Riksmuseet, Stockholm (SM); Naturhistorisches Museum, Vienna (VM); South Australia Museum, Adelaide (SAM); National Museum of Victoria, Melbourne (NMV); Western Australian Museum, Perth (WAM); University of Queensland Collection, Brisbane (UQC); Waite Agricultural Institute Collection, Adelaide (WAI); Hope Department of Entomology, University Museum, Oxford (HEC).

We also thank the following institutions for loaning type material: Rijksmuseum van Natuurlijke Historie, Leiden (LM); Museum für Naturkunde der Humboldt Universität zu Berlin (HUM).

A number of people and institutions assisted our work in Australia. At the University of Melbourne, Parkville, Victoria, and the University of Western

Australia, Nedlands, Western Australia, we were provided space, microscopes, and other equipment, supplies, and services for several months, including a very generous purchase of tapes, an extra wheel and tire for our vehicle, and invaluable assistance by departmental shop personnel at Melbourne. Murray J. Littlejohn at the University of Melbourne, our chief contact in Australia, spent much time and energy across the entire year seeing to our needs; A. R. Main at Nedlands was similarly helpful during our three months there. T. O. Browning at the Waite Agricultural Institute was our gracious and stimulating host for two days, and Noel McFarland of the South Australian Museum was particularly helpful during our two visits there. K. H. L. Key, Curator of Orthoptera at the Australian National Insect Collection, was a model host, expediting our work at Canberra in every way possible and providing welcome encouragement and intellectual stimulation. David Rentz and Steve Balderson kindly packed and sent the entire Canberra cricket collection to Philadelphia and were most helpful in furnishing other relevant data from their collection. T. W. Hogan, Principal Entomologist at the Victorian Plant Research Institute, Burnley, Victoria, supplied us with live individuals of *Teleogryllus commodus* and *T. oceanicus* for experimental purposes and assisted in several other regards. Joe Baker then of the Department of Chemistry of the University College of Townsville assisted us in securing housing and made himself available for assistance in solving all manner of problems during our four-month stay in Townsville, Queensland; his friendship was invaluable. Geoffrey Monteith of the Department of Entomology, University of Queensland, and the Queensland Museum, Brisbane, took special pains to collect for us during a trip to the rain forests near Bamaga at the tip of the Cape York Peninsula, and sent us a large number of crickets collected in pitfall traps in southeast Queensland rain forests, and Robert Cantrell of the same Department assisted us greatly during our visit to the University of Queensland. The late

Dr. Lucien Chopard of the Muséum National d'Histoire Naturelle, Paris, must be especially thanked for his friendship and encouragement regarding this project, and for his unfailing patience and promptness in supplying answers to our repeated questions by mail.

We are grateful to Ann Pace, Katharine Stayman, Donald Azuma, and especially Deborah Kotzin for their invaluable assistance. Additionally, Marcia Wardell, Deborah Griffin, and Deborah Ledingham have contributed as research assistants. Elizabeth McLeary, Preparator, and Mary Snider, Secretary of the Insect Division of the Museum of Zoology, deserve very special thanks for fulfilling promptly and without question the various strange requests that we kept pouring into the Museum of Zoology during our year in Australia. Nelson G. Hairston, in his capacity as Director of the Museum of Zoology of the University of Michigan, was imaginative, tolerant, and effective in promoting all phases of this work.

Finally, we must mention a few of the numerous Australian friends who showed various kindnesses and helped us directly and indirectly in ways too diverse to describe here: Arthur Fielding, Wayne Walton, Bob Kenney, Tom Neacy, the Opitz brothers, Terry Robinson, Tom Parry, Harold "Wombat" Pilcher, Wally Umbulgarri, Bluey Morgan, Bill and Em Simmons, Mr. and Mrs. Ray Mead, Angus Martin, Jasper Loftus-Hills, Graham Watson, and M. J. D. White. We regret that it is not possible to describe better the help given us by the above persons, and by many others not mentioned.

TYPE DEPOSITIONS

All types of species collected and described by us are deposited in the Australian National Insect Collection at Canberra. Other specimens taken by us are deposited in the Australian National Insect Collection, the Academy of Natural Sciences of Philadelphia, and the University of Michigan Museum of Zoology. Tapes and sonograms are deposited at the University of Michigan.

COLLECTING METHODS

Our methods of sampling cricket populations differ so much from those generally employed by entomologists, and lead to such different subsequent procedures in examining and comparing specimens, that a detailed explanation seems warranted.

Many of our collecting methods are similar to those used by workers whose animals do not reveal their presence and identity by singing. Although only a small amount of our material was taken by these methods, we list them here first: (1) Searching vegetation and the ground and scuffing and raking ground litter, mostly at night. (2) Sweeping vegetation night and day with a heavy muslin net. (3) Bending over limber trees and branches and examining the foliage, mostly at night. (4) Felling trees, or breaking off saplings and examining the foliage, either after the tree has fallen or while holding it upright in a cleared or bare area. (5) Laying oatmeal trails at night and checking them repeatedly. (6) Searching out pushups or burrows and digging them out, day and night. (7) Setting up lights to attract flying species. (8) Examining lighted signs, shop windows, and street lights at night. (9) Turning over boards, rubbish and stones, particularly in the daytime, and particularly on beaches and around signs and shop windows that were brightly lighted the night before.

A large number of specimens sent to us by the University of Queensland and from the CSIRO collection in Canberra were collected at lights. Numerous specimens from the Queensland Museum were collected by Monteith in pitfall traps. These are particularly important collections because we did not use either of these methods to any great extent in our collecting.

Most of our information was secured by a still different method—listening for the species-specific songs of male crickets. For each new species, and for each species not yet sampled adequately, tape recordings were made unless intermittent singing or difficulty with the terrain or vegetation made this impractical. Then an effort was made to secure an adequate sample of specimens of each species in the locality. All specimens were placed immediately in standard alcohol vials or bottles with pencilled labels that were replaced with permanent labels, usually the following morning. Tapes, species, and localities were correlated by separate numberings.

Utilizing songs as a principal method of initially distinguishing species, securing specimens, and amassing distribution records has a number of effects on the subsequent analysis and interpretation of taxonomic data. Perhaps the most important is that for the most part one knows before he begins to examine specimens microscopically which of them belong to the same and different species, and in many cases he knows even which are most likely related to one another. The morphological analysis then becomes a matter largely of locating differences and similarities between the species rather than discovering how many species were taken. In some cases morphological differences between species are located only after the most assiduous search, and in a few cases, non-overlapping morphological differences have still not been found between species originally distinguished by song differences and known to have additional differences in ecology, geography, or seasonal life history; some are known to respond only to their own song and not that of the other species and are either unable to hybridize or fail to cross-copulate even in stress matings (Alexander 1960; Alexander and Bigelow 1960; Alexander and Moore 1962).

A second effect of the use of songs to locate and identify specimens involves the attitude or approach of the collector and thus the nature of the sample of specimens taken. If one enters an area in which reside, say, 25 species belonging to the group being studied and begins to collect by sweeping with a net, by looking in various places, or by using some attractant such as a light or a chemical bait, he may ultimately leave the area with samples of 10 or 15 species and a feeling of some satisfaction. Ignorant of the presence of additional species, he will be inclined to expend more of his time taking larger series of the species he knows are there. Even if he utilizes all of the collecting methods that have previously yielded specimens of his group, his approach will be different from that of the collector who enters the same area, listens a moment, and counts 25 different species singing. This collector must make a decision whether to spend his limited time taking at least one specimen and one or more song records of each species or trying to secure larger samples of only part of the species.

One result of collecting by song, then, is the tak-

ing of many unique specimens and a paucity of long series. This problem is partially compensated in a peculiar way by the possibility, mentioned earlier, of discovering additional species differences in biology and distribution once recognition by song has been established. Thus we are led to a third important difference in taxonomic procedure resulting from the locating and identifying of specimens by song. Unique specimens, when accompanied by other kinds of data—even when accompanied only by song data—are worth considerably more in a systematic effort than are unique specimens taken “blindly” and only discovered upon subsequent morphological examination to have some particular kind of morphological distinctiveness. In the latter case there may be little or no way of assessing the likelihood that the differences observed have anything to do with reproductive isolation, particularly if the most similar species are also represented by inadequate specimen series. If song differences and a morphological gap are both demonstrable, however, in view of our general understanding of the likelihood and significance of song variation within

and between species, and particularly if more than the single or few collected specimens have been tape-recorded or even heard, then unique specimens can be used to typify species with a great deal more confidence and accuracy.

It must be clear at this point that those systematists who utilize communicative signals and isolating mechanisms as their principal means of locating and recognizing species are not simply studying biology as well as morphology, or simply using a wide variety of characters, as is commonly and justifiably considered desirable in bio-systematic work. Their entire approach, their methods of analysis, and their interpretations of particular kinds of data are all different. Further, and probably most important, their possibilities for rapid and accurate systematic coverage are unparalleled. For this reason, the groups of animals for which these techniques are possible ought to present unique opportunities for breakthroughs in biogeography and in the study of speciation and other evolutionary phenomena.

COLLECTING, TAPE RECORDING, AND LISTENING PLACES

June 1968–August 1969

From July until mid-November we worked out of Townsville, Queensland; from November until mid-April out of Melbourne, Victoria; and from April until early July out of Perth.

In addition to the following 905 localities at which some information was gathered, we stopped at 119 localities where no songs were heard and no specimens were collected. At least 100 of these involved cold evenings in the south; most of the rest were desert localities.

NEW SOUTH WALES (NSW)

- A-1. Sydney, vacant lot along Route 1, 13 vii 68

QUEENSLAND (QLD)

- A-2. Dry railroad cut west of lawn of motel, 1 mi S of Nambour, 15 vii 68
 A-3. Grazed field S of Rambler Motel, N side of Rockhampton on Route 1, 16 vii 68
 A-4. Lawns, weeds, bushes in Belgian Gardens (Townsville) near Primrose and Bundach Sts., right down to beach, 18–20 vii 68

- A-5. Townsville town common NW of A-4 a few mi, sanctuary, 19–21 vii 68
 A-6. Foot of Mt. Marlow, W of Pallarenda, 19–24 vii 68
 A-7. Along beach between Townsville and Pallarenda, 19–24 vii 68
 A-8. Hillside below Castle Rock (Townsville), 19–24 vii 68
 A-9. Ross River and Route 1 in Garbutt, 19–24 vii 68
 A-10. Stony Creek near Deeragun, 19–24 vii 68
 A-11. About 10 mi S of Townsville, W side of Route 1, 19–24 vii 68
 A-12. Alligator Creek and Route 1, ca. 15 mi SE of Townsville, 19–24 vii 68
 A-13. Bohle River and Route 1 N of Townsville, 24 vii 68
 A-14. Ca. 3–3.5 mi N of Hencamp Creek at a creek with a wooden bridge, near Kurukan, on Route 1 N of Townsville, 24 vii 68
 A-15. Saunders beach N of Townsville, in dunes behind beach, 24 vii 68
 A-16. Black River at Route 1 N of Townsville, 25 vii 68
 A-17. Burdekin River at Route 1 S of Ayr, 29 vii 68
 A-18. Alva Beach near Cape Bowling Green NE of Ayr, 30 vii 68
 A-19. Crystal Creek 41 mi N of Townsville at Route 1, just N of Mt. Spec turnoff, 31 vii 68

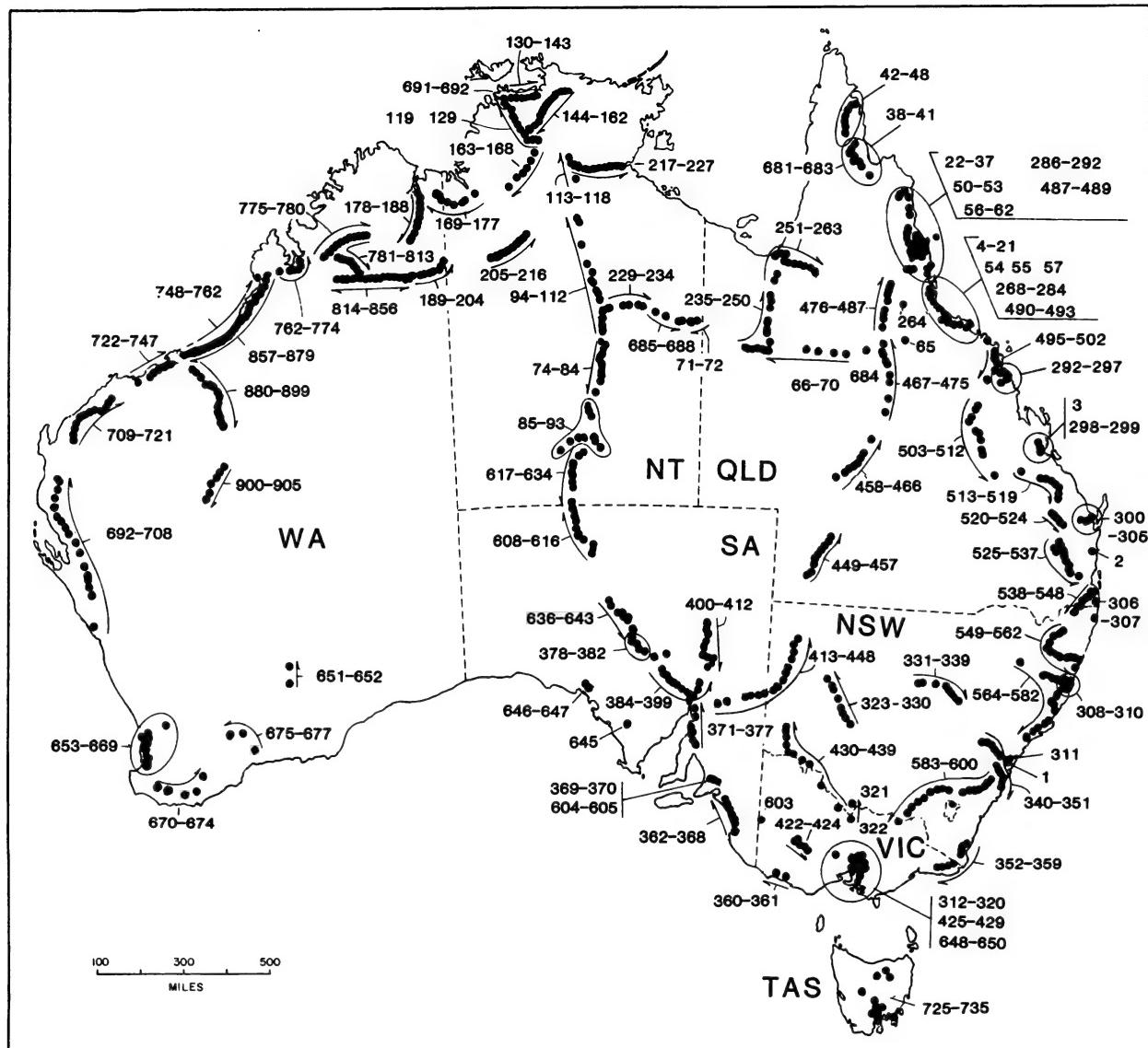


FIG. 1. Black circles indicate collecting, tape recording, and listening sites of this study.

- A-20. Herbert River and Ripple Creek confluence, N of Ingham, 31 vii 68 and E on cane road at Halifax jct. (old highway), 31 vii 68
- A-21. Near (Hiram?) Creek turnoff from new highway just N of Ingham, 31 vii 68
- A-22. At rest stop on hill N of Ingham, overlooking salt flats and mountains near coast, 5 mi or so past the Halifax jct. on old highway, 31 vii 68
- A-23. Dallachy Creek and Route 1 S of Tully, 1 viii 68
- A-24. Rain forest along road to Mission Beach from Tully, sanctuary, 1 viii 68
- A-25. Rain forest along Mission Beach Road, near beach, 1 viii 68
- A-26. Road between Route 1 and Bramston Beach north of Innisfail, 2 viii 68
- A-27. "The Boulders," forest trail along stream eastward, beginning 4 mi W of Babinda, 2 viii and 1-6 ix 68
- A-28. Oak Forest bridge across Barron River W of Kuranda, mostly sandy rocky plain E of bridge, 3 viii 68
- A-29. Highway E of Kuranda toward Route 1, 4 viii 68
- A-30. Barron River at bridge downstream from Lake Placid, 4 viii 68

- A-31. Deep Creek bridge at Route 1 N of Cairns, 4 viii 68
 A-32. Port Douglas peninsula, behind dunes at Port Douglas and along the main peninsula road, 4 viii 68
 A-33. Lyons Lookout to below Hanna Lookout S of Mossman, 5 viii 68
 A-34. 10 mi of the road toward Cape Tribulation beginning at the Daintree River, 5-10 viii 68
 A-35. Leichhardt Creek at highway N of Mt. Malloy, N side of bridge, 5-10 viii 68
 A-36. S side of Cooktown, out to about 15 mi, 5-10 viii 68
 A-37. 18 mi of road from the Whyalla Plains near Bloomfield back to Route 1 S of Cooktown, 5-10 viii 68.
 A-38. 40-45 mi N of Laura on Kennedy Highway, 11-15 viii 68
 A-39. 3 mi N of Musgrave on Kennedy Highway, 11-15 viii 68
 A-40. 10.5 mi N of Musgrave on Kennedy Highway, 11-15 viii 68
 A-41. 54 mi N of Musgrave on Kennedy Highway, 11-15 viii 68
 A-42. 30 mi N of Coen on Kennedy Highway, 11-15 viii 68
 A-43. 61 mi N of Coen on Kennedy Highway, 11-15 viii 68
 A-44. 73 mi N of Coen on Kennedy Highway at the Wenlock River, 11-15 viii 68
 A-45. Vicinity of Iron Range, 15-20 viii 68
 A-46. Portland Roads, wharf area and several miles S, 15-20 viii 68
 A-47. Iron Range, Aerodrome-Coen Road jcts. and about 8 mi S, 15-20 viii 68
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 A-49. Tolga, patch of rain forest N of Atherton and S of Tolga, 15-20 viii 68
 A-50. Malanda, forest on W side of town across road from park and just W of the Falls, 15-20 viii 68
 A-51. Magnetic Island near Townsville, 20-25 viii 68
 A-52. Millstream Falls NE of Mt. Garnet, 25-30 viii 68
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 A-54. Melton Hill, Townsville, and vicinity, 20-30 viii 68
 A-55. Marshy area N edge of Townsville, 28 viii 68
 A-56. Mountain behind Tully, Mt. Tyson, trail from water tower at SW corner of town to near painted rock near summit, 1 ix 68
 A-57. Salt marsh and mangroves north of A-22, 3 ix 68
 A-58. Barron River at Bruce Highway N of Cairns, 3 ix 68
 A-59. Noah Creek to Mount Hemmant ca. 15-20 mi N of the Daintree River and near Cape Tribulation, 3 ix 68
 A-60. Dry woods along Leichhardt Creek 17.6 mi SW of last fork before climb to Lyons (Hanna) Lookout above Mossman, 4 ix 68
 A-61. South edge of Herberton, 5 ix 68
 A-62. Lawyer Creek Road E of Ravenshoe from 5 mi E of jct. with Tully Falls Road to 12 mi E, including 5 mi of logging road running 5 mi SW from the jct. at this point, 1 ix 68
 A-63. Jarra Creek road SW of Tully near Barbed Wire Creek, 1-6 ix 68
 A-64. Bridge Creek, 18 mi N of Ingham, 1-6 ix 68
 A-65. 2 mi W of Warrigal, 165.5 mi W of Townsville, 16 ix 68
 A-66. In town of Richmond, 16 ix 68
 A-67. 20-25 mi W of Richmond and 1 mi E of Maxwelton, 16 ix 68
 A-68. Nelia, W of Richmond, 16 ix 68
 A-69. Julia Creek, 16 ix 68
 A-70. 17 mi E of Mary Kathleen, 17 ix 68
- NORTHERN TERRITORY (NT)
- A-71. 20 mi W of Camooweal, 17 ix 68
 A-72. Avon Downs, James River, 17 ix 68
 A-73. 5.5 mi S of jct. of Barkley and Stuart Highways, 18 ix 68
 A-74. 45 mi S of Tennant Creek, 18 ix 68
 A-75. Devil's Marbles, 67 mi S of Tennant Creek, 18 ix 68
 A-76. Wauchope, 18 ix 68
 A-77. 24 mi S of Wauchope, 18 ix 68
 A-78. 38 mi S of Wauchope, 18 ix 68
 A-79. 43 mi S of Wauchope, Taylor Creek, 18 ix 68
 A-80. 64 mi S of Wauchope, 5 mi N of Barrow Creek, 18 ix 68
 A-81. 5 mi S of Barrow Creek, 18 ix 68
 A-82. 24 mi S of Barrow Creek, 18 ix 68
 A-83. 46 mi S of Barrow Creek, 18 ix 68
 A-84. 70 mi S of Barrow Creek, 18 ix 68
 A-85. 6 mi N of Alice Springs, 19 ix 68
 A-86. 4 mi S of Alice Springs, 19 ix 68
 A-87. Jay Creek, 25 mi W of Alice Springs, 19 ix 68
 A-88. 56 mi W of Alice Springs, 19 ix 68
 A-89. 65 mi W of Alice Springs, 19 ix 68
 A-90. Palm Valley near Hermannsburg, 19 ix 68
 A-91. 18 mi SE of Alice Springs, 20 ix 68
 A-92. 60 mi N of Alice Springs, Conner's Well, 20 ix 68
 A-93. A few mi N of Aileron, 21 ix 68
 A-94. 14 mi S of Tennant Creek, 21 ix 68
 A-95. Tennant Creek, 21 ix 68
 A-96. 5 mi N of Tennant Creek, 21 ix 68
 A-97. 6.4 mi N of Tennant Creek, 21 ix 68
 A-98. 13.1 mi N of Tennant Creek, 21 ix 68
 A-99. 20 mi N of Tennant Creek, 21 ix 68
 A-100. 26.2 mi N of Tennant Creek, 21 ix 68
 A-101. 32.5 mi N of Tennant Creek, 21 ix 68
 A-102. 40 mi N of Tennant Creek, 21 ix 68
 A-103. 45.6 mi N of Tennant Creek, 21 ix 68
 A-104. 50.4 mi N of Tennant Creek, 21 ix 68
 A-105. 55.8 mi N of Tennant Creek, 21 ix 68
 A-106. 62.8 mi N of Tennant Creek, 21 ix 68
 A-107. 73 mi N of Tennant Creek, 21 ix 68
 A-108. 80 mi N of Tennant Creek, 21 ix 68
 A-109. 87.8 mi N of Tennant Creek, 21 ix 68
 A-110. 143 mi N of Tennant Creek, 21 ix 68
 A-111. Elliott, 22 ix 68
 A-112. Ca. 5 mi N of Dunmarra, 22 ix 68
 A-113. 312 mi N of Tennant Creek, 22 ix 68
 A-114. 359 mi N of Tennant Creek, 22 ix 68
 A-115. Roper River at Mataranka HS, 22 ix 68
 A-116. Mataranka HS, dry field, 22 ix 68
 A-117. 7.5 mi N of Mataranka, 22 ix 68
 A-118. 32 mi N of Mataranka, 22 ix 68
 A-119. Ca. 8 mi N of Katherine, 23 ix 68
 A-120. 2 mi S of Pine Creek, 23 ix 68

- A-121. 75.5 mi N of Katherine, 23 ix 68
 A-122. 82.4 mi N of Katherine, 23 ix 68
 A-123. 94.7 mi N of Katherine, 23 ix 68
 A-124. 115 mi N of Katherine, 23 ix 68
 A-125. 122 mi N of Katherine, 23 ix 68
 A-126. 129 mi N of Katherine, 23 ix 68
 A-127. 131 mi N of Katherine, 23 ix 68
 A-128. Robin Falls, 139 mi N of Katherine, 23 ix 68
 A-129. Adelaide River (town), 23 ix 68
 A-130. Darwin, E. Point, Bot. Gardens, mangroves, Recreation Pt., 24 ix 68
 A-131. Darwin, woods near Berrimah, 24 ix 68
 A-132. Darwin, Casuarina Beach, 24 ix 68
 A-133. Howard Springs, 24 ix 68
 A-134. W bank of Adelaide River near Humpty Doo, 26 ix 68
 A-135. 55 mi E of Adelaide River on road to Cooinda, 26 ix 68
 A-136. 52 mi E of Adelaide River, 26 ix 68
 A-137. 45 mi E of Adelaide River, 26 ix 68
 A-138. 31 mi E of Adelaide River, 26 ix 68
 A-139. 27 mi E of Adelaide River, 26 ix 68
 A-140. Mt. Bundy mine, 26 ix 68
 A-141. E of Adelaide River near Humpty Doo, 26 ix 68
 A-142. Berry Springs near Darwin, 27 ix 68
 A-143. Middle Arm Jetty, Blackmore River, 27 ix 68
 A-144. East Alligator River at border of Arnhem Land, 28 ix 68
 A-145. 3 mi W of East Alligator River, road to Oenpelli, 28 ix 68
 A-146. 6 mi W of East Alligator River, road to Oenpelli, 28 ix 68
 A-147. 18 mi W of East Alligator River, road to Oenpelli, 28 ix 68
 A-148. Mudginbarry Station, 28 ix 68
 A-149. 35 mi W of East Alligator River, road to Oenpelli, 28 ix 68
 A-150. 42 mi W of East Alligator River, road to Oenpelli, 28 ix 68
 A-151. 50 mi W of East Alligator River, road to Oenpelli, 28 ix 68
 A-152. 9 mi W of Cooinda, road to Pine Creek, 29 ix 68
 A-153. 18 mi SW of Cooinda, road to Pine Creek, 29 ix 68
 A-154. 25 mi SW of Cooinda, road to Pine Creek, 29 ix 68
 A-155. 32 mi SW of Cooinda, road to Pine Creek, 29 ix 68
 A-156. 38 mi SW of Cooinda, road to Pine Creek, 29 ix 68
 A-157. 43 mi SW of Cooinda, road to Pine Creek, 29 ix 68
 A-158. 47 mi SW of Cooinda, road to Pine Creek, 29 ix 68
 A-159. 50 mi SW of Cooinda, road to Pine Creek, 29 ix 68
 A-160. 59 mi SW of Cooinda, road to Pine Creek, 29 ix 68
 A-161. Jct. El Sharana and Oenpelli Roads, 29 ix 68
 A-162. 5 mi E of Mary River to Mary River, 29 ix 68
 A-163. 25 mi W of Katherine, 30 ix 68
 A-164. Limestone Creek, 34 mi W of Katherine, 30 ix 68
 A-165. 53 mi W of Katherine, 30 ix 68
 A-166. 68 mi W of Katherine, 30 ix 68
 A-167. 10 mi W of Willeroo, 30 ix 68
 A-168. Victoria River W of Willeroo, 1 x 68
 A-169. West Baines River at Auvergne, 1 x 68
 A-170. Saddle Creek, 30 x 68
 A-171. 88 mi W of Timber Creek, 1 x 68
 A-172. Keep River, 1 x 68

- A-173. Butler Creek, 1 x 68
 A-174. Northern Territory border E of Kununurra, 1 x 68

WESTERN AUSTRALIA (WA)

- A-175. 10 mi W of Northern Territory border E of Kununurra, 1 x 68
 A-176. Kununurra, 1 x 68
 A-177. Ord River W of Kununurra, W bank below dam, 1 x 68
 A-178. 10 mi SE of Wyndham, 2 x 68
 A-179. 15 mi SE of Wyndham, 2 x 68
 A-180. 30 mi SE of Wyndham, 2 x 68
 A-181. 4.8 mi S of jct. to Kununurra and 43.6 mi SE of Wyndham, 2 x 68
 A-182. 16 mi S of jct. to Kununurra, 3 x 68
 A-183. 30 mi S of jct. to Kununurra, 3 x 68
 A-184. 43 mi S of jct. to Kununurra, 3 x 68
 A-185. 61.5 mi S of jct. to Kununurra, 3 x 68
 A-186. 72.5 mi S of jct. to Kununurra, 2 x 68
 A-187. 79 mi S of jct. to Kununurra, 3 x 68
 A-188. 100 mi S of jct. to Kununurra, 3 x 68
 A-189. Hall's Creek, 4 x 68
 A-190. 7 mi E of Hall's Creek, 4 x 68
 A-191. 14 mi E of Hall's Creek, spinifex hillside and creek, 4 x 68
 A-192. 24 mi E of Hall's Creek, 4 x 68
 A-193. 31 mi E of Hall's Creek, 4 x 68
 A-194. 35 mi E of Hall's Creek, 4 x 68
 A-195. 49 mi E of Hall's Creek, 4 x 68
 A-196. 72 mi E of Hall's Creek, 4 x 68
 A-197. 80 mi E of Hall's Creek, 4 x 68
 A-198. 89 mi E of Hall's Creek, 4 x 68
 A-199. 96 mi E of Hall's Creek, 4 x 68
 A-200. 5 mi W of Nicholson, 4 x 68
 A-201. 5 mi N of Nicholson, 4 x 68
 A-202. 11 mi N of Nicholson, 4 x 68
 A-203. 17 mi N of Nicholson, 4 x 68
 A-204. Nicholson Station, 4 x 68

NORTHERN TERRITORY (NT)

- A-205. 124 mi E of Nicholson Station, 5 x 68
 A-206. 3.8 mi N of Wave Hill Station, 5 x 68
 A-207. 17.8 mi NE of Wave Hill Station, 5 x 68
 A-208. 27 mi NE of Wave Hill Station, 5 x 68
 A-209. 40 mi NE of Wave Hill Station, 5 x 68
 A-210. 46.7 mi NE of Wave Hill Station, 5 x 68
 A-211. 56 mi NE of Wave Hill Station, 5 x 68
 A-212. 68.7 mi NE of Wave Hill Station, 5 x 68
 A-213. 75.2 mi NE of Wave Hill Station, 5 x 68
 A-214. 91.3 mi NE of Wave Hill Station, 5 x 68
 A-215. 101.4 mi NE of Wave Hill Station, 5 x 68
 A-216. Top Springs, 5 x 68
 A-217. 24 mi E of Mataranka on Roper River Road, 6 x 68
 A-218. 31.7 mi E of Mataranka on Roper River Road, 6 x 68
 A-219. 41 mi E of Mataranka on Roper River Road, 6 x 68
 A-220. 51 mi E of Mataranka on Roper River Road, 6 x 68
 A-221. 52.7 mi E of Mataranka on Roper River Road, 6 x 68
 A-222. 67 mi E of Mataranka on Roper River Road, 6 x 68
 A-223. 86 mi E of Mataranka on Roper River Road, 6 x 68
 A-224. 93 mi E of Mataranka on Roper River Road, 6 x 68

- A-225. 108 mi E of Mataranka on Roper River Road, 6 x 68
 A-226. 114 mi E of Mataranka on Roper River Road, 6 x 68
 A-227. Roper Bar, 6-7 x 68
 A-228. Jct. Barkley and Stuart Highways, 7 x 68
 A-229. 15 mi E of jct. of Barkley and Stuart Highways, 7 x 68
 A-230. 45 mi E of jct. of Barkley and Stuart Highways, 7 x 68
 A-231. 61 mi E of jct. of Barkley and Stuart Highways, 7 x 68
 A-232. Frewena, 7 x 68
 A-233. 101 mi E of jct. of Barkley and Stuart Highways, 7 x 68
 A-234. 130 mi E of jct. of Barkley and Stuart Highways, 7 x 68

QUEENSLAND (QLD)

- A-235. 2 mi E of Mt. Isa, 8 x 68
 A-236. 15 mi E of Mt. Isa, 8 x 68
 A-237. 20 mi E of Mt. Isa, 8 x 68
 A-238. 38 mi E of Mt. Isa, 8 x 68

NORTHERN TERRITORY (NT)

- A-239. A few mi N of Dunmarra, 6 x 68

QUEENSLAND (QLD)

- A-240. 71 mi E of Mt. Isa, 8 x 68
 A-241. Cloncurry, 8 x 68
 A-242. 15.6 mi N of Cloncurry, 8 x 68
 A-243. 51 mi N of Cloncurry, 8 x 68
 A-244. 53 mi N of Cloncurry, 8 x 68
 A-245. 75 mi N of Cloncurry, 8 x 68
 A-246. 88 mi N of Cloncurry, 8 x 68
 A-247. 100 mi N of Cloncurry, 8 x 68
 A-248. 112 mi N of Cloncurry, 8 x 68
 A-249. 120 mi N of Cloncurry, 8 x 68
 A-250. 145 mi N of Cloncurry, 8 x 68
 A-251. 174 mi N of Cloncurry, 8 x 68
 A-252. Flinders River S of Normanton, 8 x 68
 A-253. Karumba, mangroves and eucalypt forest, 9 x 68
 A-254. 12 mi E of Karumba, 9 x 68
 A-255. 21.7 mi E of Karumba, 9 x 68.
 A-256. Walker Creek, 28.5 mi E of Karumba, 8 x 68
 A-257. Norman River N of Normanton, 8 x 68
 A-258. Norman River, 10 mi E of Normanton, 8 x 68
 A-259. 20 mi E of Normanton, 8 x 68
 A-260. 30 mi E of Normanton, 8 x 68
 A-261. 50 mi E of Normanton, 8 x 68
 A-262. 73.4 mi E of Normanton, 8 x 68
 A-263. Ca. 80 mi E of Normanton, 8 x 68
 A-264. Welcome Downs, marsh W of Green Vale turnoff, 9 x 68
 A-265. A few mi W of Hughenden, 16 ix 68

NORTHERN TERRITORY (MT)

- A-266. 14 mi W of Wonarah, 18 ix 68

QUEENSLAND (QLD)

- A-267. Mt. Stuart S of Townsville, 20 x 8
 A-268. 3 mi W of Running River W of Paluma, 22 x 68
 A-269. Running River, 22 x 68
 A-270. 2.2 mi E of Running River, 22 x 68
 A-271. 3.6 mi E of Running River, 22 x 68
 A-272. 4.1 mi E of Running River, 22 x 68

- A-273. 5.9 mi E of Running River, 22 x 68
 A-274. 8.1 mi E of Running River, 22 x 68
 A-275. 10.1 mi E of Running River, 22 x 68
 A-276. 12 mi E of Running River, 22 x 68
 A-277. Paluma, Mt. Spec lookout, 22 x 68
 A-278. 2 mi E of Paluma, 22 x 68
 A-279. 4 mi E of Paluma, 22 x 68
 A-280. 5 mi E of Paluma, 22 x 68
 A-281. 6.6 mi E of Paluma, 22 x 68
 A-282. Green Island E of Cairns, 25 x 68
 A-283. Rollingstone Creek N of Townsville, 22 x 68
 A-284. Bluewater Creek N of Townsville, 22 x 68
 A-285. From 0.3 mi N toward Cooktown at the last beach turn-off at Cape Tribulation S to one mi N of Mount Hemannt, 5-10 viii 68, 3 ix 68
 A-286. 7.9 mi W of Gordonvale, the Ross and Locke picnic area, 30 x 68
 A-287. 12.4 mi W of Gordonvale, 30 x 68
 A-288. 19.6 mi W of Gordonvale, 30 x 68
 A-289. State forest SE of Yungaburra on road to Malanda, 30 x 68
 A-290. Palmerston National Forest 11 mi E of Millaa Millaa, 30 x 68
 A-291. 17.1 mi E of Millaa Millaa, 30 x 68
 A-292. 18.3 mi E of Millaa Millaa, 30 x 68
 A-293. 3.2 mi N of Mt. Jukes-Seaforth jct. NE of Mackay, dry woods and border of canefield, 5 xi 68
 A-294. 2.2 mi N of Mt. Jukes-Seaforth jct., creek, 5 xi 68
 A-295. Seaforth, NE of Mackay, from W of town to beach, 5 xi 68
 A-296. 7 mi W of Seaforth, 5 xi 68
 A-297. Neilson Creek W of Seaforth, 5 xi 68
 A-298. Limestone Creek at Yeppoon jct. N of Rockhampton, 6 xi 68
 A-299. Banks of Fitzroy River in Rockhampton, 6 xi 68
 A-300. Maryborough, E side of town on road to Hervey Bay, 7 xi 68
 A-301. Susan River on road to Hervey Bay, 7 xi 68
 A-302. 50 mi S of Gin Gin, dry woods, 7 xi 68
 A-303. Hervey Bay, bushes behind beach, 7 xi 68
 A-304. 13 mi E of Maryborough on road to Hervey Bay, 7 xi 68
 A-305. Saltwater Creek E of Maryborough, 7 xi 68
 A-306. 6-8 mi N of Coolangatta, wooded hill, 8 xi 68

NEW SOUTH WALES (NSW)

- A-307. Ca. 115 mi S of Coolangatta, 9 xi 68
 A-308. Kempsey, 9 xi 68
 A-309. A few mi SW of Kempsey, eucalypt forest, 9 xi 68
 A-310. Crescent Head E of Kempsey, 9 xi 68
 A-311. Sydney, 10 xi 68

VICTORIA (VIC)

- A-312. Merricreek, 3 mi S of Wandong, about 28 mi N of Melbourne, Victoria, 26 xi 68
 A-313. 9.25 mi N of Kinglake West, ca. 28 mi N of Melbourne, 26 xi 68

QUEENSLAND (QLD)

- A-314. S of Mareeba, Queensland, in dry open woods, exact spot unknown; gully, 5-10 viii 68

VICTORIA (VIC)

- A-315. South Yarra, streets near Hawksburne railway station, 12 xii 68
 A-316. Whittlesea, Plenty (or Yarra) Creek on W side of town, 14 xii 68
 A-317. 5 mi W of Kinglake, near Pheasant Creek, 19 xii 68
 A-318. Phillip Island, 19 xii 68
 A-319. 0.7 mi S of Bass, 19 xii 68
 A-320. Yallock Creek near Koo-wee-rup, 19-25 xii 68
 A-321. Echuca, 26 xii 68

NEW SOUTH WALES (NSW)

- A-322. Deniliquin, 26 xii 68
 A-323. Willandra Creek near Mossiel, ca. 30 mi S of Ivanhoe, 27 xii 68
 A-324. Waterhole about 100 mi S of Wilcannia, 27 xii 68
 A-325. 90 mi S of Wilcannia, 27 xii 68
 A-326. 80 mi S of Wilcannia, 27 xii 68
 A-327. 50 mi S of Wilcannia, 27 xii 68
 A-328. 30 mi S of Wilcannia, 27 xii 68
 A-329. 24 mi S of Wilcannia, 27 xii 68
 A-330. Wilcannia, 27 xii 68
 A-331. 62 mi W of Nyngan, 28 xii 68
 A-332. 49 mi W of Nyngan, 28 xii 68
 A-333. 28 mi W of Nyngan, 28 xii 68
 A-334. 4 mi W of Nyngan, 28 xii 68
 A-335. 2 mi W of Nyngan at Bogan River, 28 xii 68
 A-336. 15 mi SE of Nyngan, Mullengudgery, 28 xii 68
 A-337. Nevertire, 28 xii 68
 A-338. 5 mi NE of Trangie, 28 xii 68
 A-339. 4 mi NE of Trangie, 28 xii 68
 A-340. A few mi E of Bathurst on hill, 29 xii 68
 A-341. Creek 8 mi W of Lithgow, jct. Route 32 and road to Wallenawang, 29 xii 68
 A-342. E side of Lithgow at cemetery, 29 xii 68
 A-343. 3 mi W of Springwood on Route 32 at Katoomba, 29 xii 68
 A-344. Penrith, 29 xii 68
 A-345. 8 mi NE of Picton on Hume Highway, 29 xii 68
 A-346. 1-5 mi S of Wollongong-Appin jct., 29 xii 68
 A-347. Jct. to Mt. Kembla on Picton-Wollongong Road, 29 xii 68
 A-348. 3 mi S of Wollongong, 29 xii 68
 A-349. Macquarie River, Princess Highway at jct. to Moss Vale, 29 xii 68
 A-350. 7 mi S of jct. to Moss Vale, 29 xii 68
 A-351. Beach E of Berry, 29 xii 68
 A-352. Woods near Yowaka, 30 xii 68
 A-353. Shadracks Creek 3 mi W of Eden, 30 xii 68
 A-354. Whelan's Swamp near Eden, 30 xii 68

VICTORIA (VIC)

- A-355. 24 mi E of Scrubby Creek, 30 xii 68
 A-356. Scrubby Creek, 30 xii 68
 A-357. Reedy Creek, 30 xii 68
 A-358. Ca. 25 mi E of Orbost on Princes Highway, 30 xii 68
 A-359. Near Orbost, Victoria, 30 xii 68
 A-360. Moyne River near Port Fairy, 6 i 69
 A-361. Eumeralla River E of Portland, 6 i 69

SOUTH AUSTRALIA (SA)

- A-362. Beach NW of Kingston, S. Australia, 7 i 69
 A-363. 14 mi N of Kingston, 7 i 69
 A-364. 24 mi N of Kingston, 7 i 69
 A-365. 34 mi N of Kingston, 7 i 69
 A-366. 49 mi N of Kingston, 7 i 69
 A-367. 74 mi N of Kingston, 7 i 69
 A-368. 84 mi N of Kingston, 7 i 69
 A-369. Hallett's Cove near Adelaide, 8 i 69
 A-370. Belair National Park near Adelaide, 8 i 69
 A-371. A few mi N of Kulpara, 9 i 69
 A-372. Bute, 9 i 69
 A-373. 11 mi N of Bute, 9 i 69
 A-374. Port Broughton, 9 i 69
 A-375. 8 mi N of Port Broughton, 9 i 69
 A-376. A few mi N of Port Pirie, 9 i 69
 A-377. 26 mi N of Port Pirie at creek, 9 i 69
 A-378. 30 mi E of Kingoonya, 10 i 69
 A-379. 29 mi E of Kingoonya, 10 i 69
 A-380. 25 mi E of Kingoonya, 10 i 69
 A-381. 17 mi E of Kingoonya, 10 i 69
 A-382. Kingoonya, 10 i 69
 A-383. 5 mi N of Kingoonya, 10 i 69
 A-384. Wirrappa, near Woomera, 11 i 69
 A-385. 87 mi NW of Port Augusta, road to Woomera, 11 i 69
 A-386. 80 mi NW of Port Augusta, 11 i 69
 A-387. 72 mi NW of Port Augusta, 11 i 69
 A-388. 64 mi NW of Port Augusta, 11 i 69
 A-389. 54 mi NW of Port Augusta, 11 i 69
 A-390. 43 mi NW of Port Augusta, 11 i 69
 A-391. 32 mi NW of Port Augusta, 11 i 69
 A-392. 21 mi NW of Port Augusta, 11 i 69
 A-393. 10 mi NW of Port Augusta, 11 i 69
 A-394. Port Augusta, 11 i 69
 A-395. 15 mi NE of Port Augusta, 11 i 69
 A-396. Quorn, 11 i 69
 A-397. 6 mi N of Quorn, road to Warren Gorge, 11 i 69
 A-398. 9 mi N of Quorn, 11 i 69
 A-399. Warren Gorge, 11 i 69
 A-400. 6.5 mi N of Lyndhurst, 12 i 69
 A-401. 0.5 mi N of Lyndhurst, 12 i 69
 A-402. 6 mi S of Lyndhurst, 12 i 69
 A-403. 7.9 mi S of Lyndhurst, 12 i 69
 A-404. Leigh Creek, 12 i 69
 A-405. Copley, 12 i 69
 A-406. 10 mi S of Leigh Creek, 12 i 69
 A-407. 7 mi E of Parachilna, 12 i 69
 A-408. 10 mi W of Blinman, 12 i 69
 A-409. 5 mi W of Blinman, 12 i 69
 A-410. Blinman, 12 i 69
 A-411. 5 mi S of Blinman, 12 i 69
 A-412. Aroona Valley, 12 i 69
 A-413. 9 mi E of Peterborough on road to Broken Hill, 13 i 69
 A-414. 22 mi E of Peterborough, 13 i 69
 A-415. 79 mi E of Peterborough, 13 i 69
 A-416. 82 mi E of Peterborough, 13 i 69
 A-417. 125 mi E of Peterborough, 13 i 69
 A-418. 139 mi E of Peterborough, 13 i 69

NEW SOUTH WALES (NSW)

- A-419. Ca. 30 mi W of Broken Hill, 13 i 69
 A-420. Ca. 20 mi W of Broken Hill, 13 i 69
 A-421. Broken Hill, Stirlingvale Creek, 13 i 69

VICTORIA (VIC)

- A-422. 27 mi W of Hall's Gap on road from Horsham near Won-wondah East, 14 i 69
 A-423. 17 mi W of Hall's Gap, 14 i 69
 A-424. Near Hall's Gap, Grampian Range, 14 i 69
 A-425. 2 mi E of Healesville on Don Road toward Donna Bouang, 2 ii 69
 A-426. Sherbrooke Forest, below Sassafras, 11 ii 69
 A-427. Donna Bouang Mt., ca. 12 mi N of Warburton, 3 ii 69
 A-428. South Yarra, 80 Cromwell Road, 3 ii 69
 A-429. 2.5 mi SE of Gisborne, 11 ii 69
 A-430. 6 mi S of Kerang on Route 16, 11 ii 69
 A-431. Piangil, 24 mi E of Manangatang, 11 ii 69

NEW SOUTH WALES (NSW)

- A-432. Euston, 11 ii 69
 A-433. 15 mi W of Euston, 11 ii 69
 A-434. 5 mi SE of Gol Gol near Mildura, 11 ii 69
 A-435. 5 mi W of Buronga, 11 ii 69
 A-436. 162 mi S of Broken Hill, 11 ii 69
 A-437. 130 mi S of Broken Hill, 11 ii 69
 A-438. 125 mi S of Broken Hill, 11 ii 69
 A-439. 100 mi S of Broken Hill, 11 ii 69
 A-440. Smith's Well, 24 mi N of Broken Hill, 12 ii 69
 A-441. 34 mi N of Broken Hill, Gairdner Creek, 12 ii 69
 A-442. Ca. 44 mi N of Broken Hill, 12 ii 69
 A-443. Ca. 54 mi N of Broken Hill, 12 ii 69
 A-444. 140 mi S of Tibooburra, 12 ii 69
 A-445. 125 mi S of Tibooburra, 12 ii 69
 A-446. 107 mi S of Tibooburra, 12 ii 69
 A-447. 100 mi S of Tibooburra, 12 ii 69
 A-448. 76 mi S of Tibooburra, 12 ii 69

QUEENSLAND (QLD)

- A-449. Ca. 20 mi SW of Noccundra, 13 ii 69
 A-450. Noccundra, 13 ii 69
 A-451. Ca. 25 mi N of Noccundra, 13 ii 69
 A-452. 8 mi SW of Bundeena, 13 ii 69
 A-453. Near Bundeena HS, 13 ii 69
 A-454. Ca. 18 mi NE of Bundeena, 13 ii 69
 A-455. Ca. 35 mi NE of Bundeena, 13 ii 69
 A-456. Jct. Mt. Howitt and Bundeena, 13 ii 69
 A-457. 11 mi SW of Eromanga, 13 ii 69
 A-458. Jundah, 14 ii 69
 A-459. Ca. 17 mi S of Stonehenge (top of hill), 14 ii 69
 A-460. Ca. 16 mi S of Stonehenge (bottom of hill), 14 ii 69
 A-461. 10 mi S of Stonehenge, 14 ii 69
 A-462. Ca. 3 mi NE of Stonehenge, 14 ii 69
 A-463. Ca. 10 mi NE of Stonehenge, 14 ii 69
 A-464. 86 mi SW of Longreach, 14 ii 69
 A-465. 55 mi SW of Longreach, 14 ii 69
 A-466. Longreach, 15 ii 69
 A-467. 11 mi N of Muttaburra, 15 ii 69
 A-468. 100 mi N of Longreach, 15 ii 69

A-469. 124 mi N of Longreach, 15 ii 69

- A-470. 55 mi S of Hughenden, 15 ii 69
 A-471. 47 mi S of Hughenden, 15 ii 69
 A-472. 39 mi S of Hughenden, 15 ii 69
 A-473. 25 mi S of Hughenden, 15 ii 69
 A-474. 17 mi S of Hughenden, 15 ii 69
 A-475. Hughenden, 15 ii 69
 A-476. Ca. 60 mi N of Hughenden, 15 ii 69
 A-477. 74.3 mi N of Hughenden, 15 ii 69
 A-478. 75.8 mi N of Hughenden, 15 ii 69
 A-479. 81 mi N of Hughenden, 16 ii 69
 A-480. 100 mi N of Hughenden, 16 ii 69
 A-481. 120 mi N of Hughenden, 16 ii 69
 A-482. 140 mi N of Hughenden, 16 ii 69
 A-483. 155 mi N of Hughenden, 1 mi N of Lynd, 16 ii 69
 A-484. 170 mi N of Hughenden, 16 ii 69
 A-485. Eight-Mile Creek, 188 mi N of Hughenden, 16 ii 69
 A-486. Ca. 195 mi N of Hughenden, 16 ii 69
 A-487. Ravenshoe, 17 ii 69
 A-488. The Craters, S of Atherton, 17 ii 69
 A-489. Palmerston National Forest, 17 ii 69
 A-490. Ca. 10 mi W of Paluma, 19 ii 69
 A-491. 8 mi W of Paluma, 19 ii 69
 A-492. 2 mi E of Paluma, 19 ii 69
 A-493. Bluewater Creek N of Townsville, 19 ii 69, near duplicate of 284.
 A-494. Duck Creek S of Bowen, 20 ii 69
 A-495. Lethe Brook, 5 mi S of Proserpine, 20 ii 69
 A-496. 8 mi N of Kungurri, 20 ii 69
 A-497. 3 mi N of Kungurri, 20 ii 69
 A-498. 1 mi SE of Kungurri, 20 ii 69
 A-499. Eungella National Park, 20 ii 69
 A-500. Near Mirani, 20 ii 69
 A-501. Ca. 25 mi NE of Nebo on road to Eton, 21 ii 69
 A-502. 20 mi NE of Nebo, 21 ii 69
 A-503. Cherwell Creek, 55 mi NE of Clermont, 21 ii 69
 A-504. 48 mi NE of Clermont, 21 ii 69
 A-505. 19 mi NE of Clermont, 21 ii 69
 A-506. Creek N of Clermont, 21 ii 69
 A-507. Avor Creek 31 mi SE of Clermont, 21 ii 69
 A-508. Capella, 21 ii 69
 A-509. 23 mi N of Emerald, 21 ii 69
 A-510. 6 mi N of Emerald, 21 ii 69
 A-511. Ca. 10 mi S of Emerald, 21 ii 69
 A-512. 27 mi W of Bauhinia Downs, 22 ii 69
 A-513. Dawson River at Dawson Highway, 22 ii 69
 A-514. 19 mi S of Thangool, 22 ii 69
 A-515. 18 mi NE of Monto, 22 ii 69
 A-516. 13 mi N of Monto, 22 ii 69
 A-517. Near Cania, 17 mi N of Monto, Cedar Creek Gorge, 22 ii 69
 A-518. 13 mi S of Monto, 22 ii 69
 A-519. Three Moon Creek, 26 mi S of Monto, 22 ii 69
 A-520. Ceratodus, 22 ii 69
 A-521. 10 mi SE of Eidsvold, 22 ii 69
 A-522. 27 mi SE of Eidsvold, 22 ii 69
 A-523. Ca. 40 mi SE of Eidsvold, 22 ii 69
 A-524. 40 mi N of Goomeri, 23 ii 69
 A-525. Kingaroy, 23 ii 69

- A-526. 7-8 mi off Bunya Highway toward Bunya Mts., 23 ii 69
 A-527. Bunya Mt. National Park, 23 ii 69
 A-528. Allen Anger Lookout, Bunya Mts., 23 ii 69
 A-529. 5 mi SE of Allen Anger Lookout, 23 ii 69
 A-530. 8 mi W of Maidenwell, 23 ii 69
 A-531. 1 mi S of Maidenwell, 23 ii 69
 A-532. 5 mi N of Cooyar, 23 ii 69
 A-533. Few mi S of Cooyar, 23 ii 69
 A-534. 21 mi SE of Cooyar, 23 ii 69
 A-535. Crow's Nest, 23 ii 69
 A-536. 43 mi W of Esk, 23 ii 69
 A-537. 23 mi W of Esk, 23 ii 69
 A-538. Mt. Tambourine, lower dry woods, 24 ii 69
 A-539. Mt. Tambourine, rain forest, 24 ii 69
 A-540. S of Mt. Tambourine (grassy field), 24 ii 69
 A-541. A few mi SE of Beaudesert, 24 ii 69
 A-542. Turnrookum Creek SE of Beaudesert, 24 ii 69
 A-543. Near Rathdowney, 24 ii 69
 A-544. Near Tylerville, 24 ii 69

NEW SOUTH WALES (NSW)

- A-545. 7.3 mi N of Woodenbong, 24 ii 69
 A-546. Woodenbong, 24 ii 69
 A-547. 4 mi S of Woodenbong, 25 ii 69
 A-548. 12 mi S of Woodenbong, 25 ii 69
 A-549. 28 mi S of Tentorfield, 25 ii 69
 A-550. 2 mi S of Deepwater, 25 ii 69
 A-551. 11 mi NE of Glen Innes, 25 ii 69
 A-552. Ben Lomond Hill, 15 mi S of Glen Innes, 25 ii 69
 A-553. Guyra, 25 ii 69
 A-554. 21 mi E of Guyra, 25 ii 69
 A-555. 33 mi E of Guyra, Kangaroo Creek, 25 ii 69
 A-556. 9 mi E of Ebor, 25 ii 69
 A-557. 19 mi NE of Ebor, 25 ii 69
 A-558. Moonpah near Dorrigo, 25 ii 69
 A-559. 6 mi NW of Dorrigo, 25 ii 69
 A-560. Dorrigo Mountain State Forest, 25 ii 69
 A-561. 9 mi N of Fermount, 25 ii 69
 A-562. Newry State Forest near Urunga, 25 ii 69
 A-563. 39.2 mi NW of Wauchope, 26 ii 69
 A-564. 52 mi NW of Wauchope, 26 ii 69
 A-565. 83 mi NW of Wauchope, 26 ii 69
 A-566. 51 mi NW of Wauchope, 26 ii 69
 A-567. 37 mi NW of Wauchope, 26 ii 69
 A-568. Ellenborough River 21 mi W of Wauchope, 26 ii 69
 A-569. 7 mi W of Wauchope, 26 ii 69
 A-570. 8 mi NE of Comboyne, 26 ii 69
 A-571. 4 mi NE of Comboyne, 26 ii 69
 A-572. 5 mi SW of Comboyne, 26 ii 69
 A-573. 16 mi SW of Comboyne, 26 ii 69
 A-574. Wingham, 26 ii 69
 A-575. Taree, 26 ii 69
 A-576. 60 mi S of Taree, 26 ii 69
 A-577. Ca. 80 mi SW of Taree, 26 ii 69
 A-578. Ca. 88 mi SW of Taree, 26 ii 69
 A-579. Ca. 98 mi SW of Taree, 26 ii 69
 A-580. Ca. 130 mi SW of Taree, 26 ii 69
 A-581. 10 mi NW of Newcastle, 26 ii 69
 A-582. Few mi S of Swansea, 26 ii 69

- A-583. Camden, 27 ii 69
 A-584. 28.5 mi SW of Camden, 27 ii 69
 A-585. 14 mi SW of Mittagong, 27 ii 69
 A-586. 29 mi E of Goulburn, 27 ii 69
 A-587. Goulburn, 27-30 i 69
 A-588. 8 mi W of Goulburn, 27-30 i 69
 A-589. 37 mi SW of Goulburn, 27-30 i 69

A.C.T.

- A-590. Black Mountain, Canberra, 27 i 69

NEW SOUTH WALES (NSW)

- A-591. Yass, 28 ii 69
 A-592. 5 mi W of Yass, 28 ii 69
 A-593. 27 mi W of Yass, 28 ii 69
 A-594. 4 mi SW of Coolac, 28 ii 69
 A-595. 12 mi SW of Gundagei, 28 ii 69
 A-596. Tarcutta, 28 ii 69
 A-597. 21 mi SW of Tarcutta, 28 ii 69
 A-598. 6 mi SW of Holbrook, 28 ii 69
 A-599. 12 mi NE of Albury, 28 ii 69

VICTORIA (VIC)

- A-600. 18 mi SW of Albury, 28 ii 69
 A-601. E of Belgrave, 26 iii 69
 A-602. 10 mi E of Horsham, 31 iii 69
 A-603. 1.5 mi E of Mt. Stapleton, 31 iii 69

SOUTH AUSTRALIA (SA)

- A-604. 30 mi E of Adelaide, 1 iv 69
 A-605. Hahndorf, 1 iv 69
 A-606. 75 mi E of Kingoonyah, 4 iv 69
 A-607. 2 mi N of Kingoonyah, 4 iv 69
 A-608. 30 mi S of Welbourne Hill, 5 iv 69
 A-609. 15 mi S of Welbourne Hill, 5 iv 69
 A-610. Welbourne Hill, 5 iv 69
 A-611. Ca. 40 mi NW of Welbourne Hill, 5 iv 69
 A-612. Ca. 50 mi N of Welbourne Hill, 5 iv 69
 A-613. 63 mi N of Welbourne Hill, Granite Downs, 5 iv 69
 A-614. 25 mi N of Granite Downs, 5 iv 69
 A-615. 28 mi N of Granite Downs, 5 iv 69
 A-616. 43 mi N of Granite Downs (at creek), 5 iv 69

NORTHERN TERRITORY (NT)

- A-617. SE side of Alice Springs, 6-7 iv 69
 A-618. 2 mi W of Alice Springs, 6-7 iv 69
 A-619. Simpson's Gap, 7 iv 69
 A-620. 50 mi SW of Alice Springs, 8 iv 69
 A-621. 52 mi SW of Alice Springs, 8 iv 69
 A-622. Telegraph Station E of Alice Springs, 8 iv 69
 A-623. Orange Creek, 59.5 mi SW of Alice Springs, 8 iv 69
 A-624. 60 mi S of Alice Springs, 8 iv 69
 A-625. 67 mi S of Alice Springs, 8 iv 69
 A-626. 69 mi S of Alice Springs, 8 iv 69
 A-627. 75 mi S of Alice Springs, 8 iv 69
 A-628. 90 mi S of Alice Springs, 8 iv 69
 A-629. 100 mi S of Alice Springs, 8 iv 69
 A-630. 114 mi S of Alice Springs, 8 iv 69
 A-631. 122 mi S of Alice Springs, 8 iv 69

- A-632. 141 mi S of Alice Springs, 8 iv 69
 A-633. 180 mi S of Alice Springs, 8 iv 69
 A-634. 10 mi N of Sundown, 8 iv 69

SOUTH AUSTRALIA (SA)

- A-635. Wantapella Bore, 56 mi NW of Welbourne Hill, 8 iv 69
 A-636. 30 mi S of Coober Pedy, 8 iv 69
 A-637. 45 mi S of Coober Pedy, 8 iv 69
 A-638. 102 mi N of Kingoonyah, 8 iv 69

NORTHERN TERRITORY (NT)

- A-639. 4 mi S of Erlunda, 8 iv 69

SOUTH AUSTRALIA (SA)

- A-640. 89 mi N of Kingoonyah, 9 iv 69
 A-641. 73 mi N of Kingoonyah, 9 iv 69
 A-642. 40 mi N of Kingoonyah, 9 iv 69
 A-643. 18 mi N of Kingoonyah, 9 iv 69
 A-644. 40-45 mi E of Kingoonyah, 9 iv 69
 A-645. Kyancutta, 11 iv 69
 A-646. 9 mi E of Ceduna, 11 iv 69
 A-647. Ceduna, 11 iv 69

VICTORIA (VIC)

- A-648. Toorak Rd. and Church St., South Yarra, iii 69
 A-649. Little Collins and Swanston Sts., Melbourne, iii 69
 A-650. Camberwell, near Lansell Crescent, xi 68 to iii 69

WESTERN AUSTRALIA (WA)

- A-651. N of Widgiemooltha, 14 iv 69
 A-652. 3 mi S of Kalgoorlie, 14 iv 69
 A-653. Near Northam, 15 iv 69
 A-654. Spearwood, Rockingham Road, 21 iv 69
 A-655. E of Medina on Thomas Road, 21 iv 69
 A-656. S edge of Armadale, 21 iv 69
 A-657. Brookton Highway E of Roleystone, 22 iv 69
 A-658. Guildford, Swan River at West Swan Road, 25 iv 69

SOUTH AUSTRALIA (SA)

- A-659. Woomera, 11 i 69

NEW SOUTH WALES (NSW)

- A-660. Fernmount, 25 ii 69
 A-661. Kempsey, 26 ii 69 = A-308.

WESTERN AUSTRALIA (WA)

- A-662. Cottesloe Beach near Eric Road, iv-vi 69
 A-663. 4 mi W of Pinjarra, 28 iv 69
 A-664. 5 mi E of Waroona, 28 iv 69
 A-665. Stirling Highway near Univ. of W.A., 27 iv 69
 A-666. 3 mi E of Waroona, 28 iv 69
 A-667. 10 mi S of Waroona, 28 iv 69
 A-668. 20 mi S of Waroona, 28 iv 69
 A-669. 14 mi S of Bunbury, 28 iv 69
 A-670. 25 mi ESE of Manjimup, 29 iv 69
 A-671. 41 mi ESE of Manjimup, 29 iv 69
 A-672. 30 mi W of Mt. Barker, 29 iv 69
 A-673. 12 mi E of Mt. Barker, 29 iv 69
 A-674. 6 mi S of Borden, 29 iv 69

- A-675. 10 mi W of Ravensthorpe, 29 iv 69
 A-676. 88 mi NW of Ravensthorpe, 29 iv 69
 A-677. 5 mi W of Hyden, 29 iv 69

QUEENSLAND (QLD)

- A-678. Ca. 10 mi SW of Townsville at Stuart Creek, 22 vii 69
 A-679. Bramston Beach, within ¼ mile of the ocean, 2 viii 68,
 20 ii 69
 A-680. 5 mi SW of Alva Beach NE of Ayr, 31 vii 69
 A-681. 20.5 mi N of Musgrave, 11-15 viii 68
 A-682. 35 mi N of Musgrave, 11-15 viii 68
 A-683. 42 mi N of Musgrave, 11-15 viii 68
 A-684. Near Marathon, W of Hughenden, 16 ix 69

NORTHERN TERRITORY (NT)

- A-685. 22 mi E of Soudan, 17 ix 69
 A-686. 3 mi E of Soudan, 17 ix 69
 A-687. 1 mi W of Barry Caves, 17 ix 69
 A-688. 14 mi W of Wonarah, 17-18 ix 69
 A-689. Mary River E of Pine Creek, 29 ix 69
 A-690. Botanical Gardens, Darwin, 25 ix 69
 A-691. Mangroves near shipyard, Darwin, 25 ix 69
 A-692A. East Point, Darwin, woods behind beach, 25 ix 69

WESTERN AUSTRALIA (WA)

- A-692B. 6 mi S of Geraldton, 9 v 69
 A-693. 63 mi N of Geraldton, 10 v 69
 A-694. 85 mi N of Geraldton, 10 v 69
 A-695. 99 mi N of Geraldton, 10 v 69
 A-696. 105 mi N of Geraldton, 10 v 69
 A-697. 10 mi N of Wannoo (Billabong Cafe), 10 v 69
 A-698. 33 mi N of Wannoo, 10 v 69
 A-699. 57 mi N of Wannoo, 10 v 69
 A-700. 11 mi N of the Wooramel River, 10 v 69
 A-701. 31 mi N of the Wooramel River, 10 v 69
 A-702. 50 mi N of the Wooramel River, 10 v 69
 A-703. 65 mi N of the Wooramel River, 10 v 69
 A-704. Gascoyne River at Route 1, 10 v 69
 A-705. 39 mi N of the Gascoyne River, 10 v 69
 A-706. 54 mi N of the Gascoyne River, 10 v 69
 A-707. 72 mi N of the Gascoyne River, 10 v 69
 A-708. Minilya, 82 mi N of the Gascoyne River, 10 v 69
 A-709. 45 mi S of the Ashburton River, 11 v 69
 A-710. 34 mi S of the Ashburton River, 11 v 69
 A-711. 22 mi S of the Ashburton River, 11 v 69
 A-712. 1 mi S of the Ashburton River, 11 v 69
 A-713. Ashburton River at Route 1, 11 v 69
 A-714. 17 mi E of the Ashburton River, 11 v 69
 A-715. 27 mi E of the Ashburton River, 11 v 69
 A-716. Cane River at Route 1, 40 mi N of the Ashburton River,
 11 v 69
 A-717. 15 mi E of the Cane River, 11 v 69
 A-718. About 143 mi SW of Roeburne, 11 v 69
 A-719. About 133 mi SW of Roeburne, 11 v 69
 A-720. About 107 mi SW of Roeburne, 11 v 69
 A-721. About 86 mi SW of Roeburne, 11 v 69
 A-722. Roeburne, 12 v 69
 A-723. Creek 17 mi E of Roeburne, 12 v 69
 A-724. Sherlock River at Route 1, 12 v 69

TASMANIA (TAS)

- A-725. Launceston, 31 iii 69
 A-726. Conara jct., 1 iv 69
 A-727. 12 mi N of Hobart, 1 iv 69
 A-728. Cygnet, 2 iv 69
 A-729. Huonville, 2 iv 69
 A-730. Port Arthur, 3 iv 69
 A-731. Hobart, 4 iv 69
 A-732. Graitna, 5 iv 69
 A-733. Hamilton, 5 iv 69
 A-734. Bronte Park, 5 iv 69
 A-735. 20 mi W of Launceston, 7 iv 69

WESTERN AUSTRALIA (WA)

- A-736. Ca. 3 mi N of Whim Creek, 12 v 69
 A-737. 23 mi N of Whim Creek, 57 mi E of Roeburne, 12 v 69
 A-738. Poverty Creek, 66 mi E of Roeburne, 12 v 69
 A-739. Creek 68 mi E of Roeburne, 12 v 69
 A-740. 75 mi E of Roeburne, 12 v 69
 A-741. 80.5 mi E of Roeburne, waterhole, 12 v 69
 A-742. Wide River, 87.5 mi E of Roeburne, 12 v 69
 A-743. West Turner River, 107.5 mi E of Roeburne, 12 v 69
 A-744. Creek, 120 mi E of Roeburne, 12 v 69
 A-745. Port Hedland, 12 v 69
 A-746. 21 mi E of Port Hedland, 12 v 69
 A-747. 32 mi E of Port Hedland, 12 v 69
 A-748. 163 mi NE of Port Hedland, 13 v 69
 A-749. 231 mi NE of Port Hedland, 13 v 69
 A-750. 246 mi NE of Port Hedland, 13 v 69
 A-751. 263 mi NE of Port Hedland, 13 v 69
 A-752. 272 mi NE of Port Hedland, 13 v 69
 A-753. 282 mi NE of Port Hedland, 13 v 69
 A-754. 292 mi NE of Port Hedland, 13 v 69
 A-755. 302 mi NE of Port Hedland, red soil, woods, 13 v 69
 A-756. 322 mi NE of Port Hedland, red soil, woods, 13 v 69
 A-757. 332 mi NE of Port Hedland, red soil, woods, 13 v 69
 A-758. 342 mi NE of Port Hedland, red soil, woods, 13 v 69
 A-759. 357 mi NE of Port Hedland, red soil, woods, 13 v 69
 A-760. 360 mi NE of Port Hedland, gray soil, plain, 13 v 69
 A-761. 368 mi NE of Port Hedland, red soil, woods, 13 v 69
 A-762. 21 mi E of Broome, jct. to Port Hedland, 14 v 69
 A-763. 68 mi NE of Broome, 14 v 69
 A-764. 30 mi S of Cooktown, 14 v 69, QLD
 A-765. Just N of Stony Creek turnoff near Townsville, 29 v 69, QLD
 A-766. 83 mi NE of Broome, 14 v 69
 A-767. Fitzroy River at Route 1, 14 v 69
 A-768. 2 mi NE of the Fitzroy River, 14 v 69
 A-769. 10 mi NE of the Fitzroy River, Derby jct., 14 v 69
 A-770. 23 mi SE of Derby, 14 v 69
 A-771. 13 mi SE of Derby, 14 v 69
 A-772. 3 mi SE of Derby, 14 v 69
 A-773. Broome, 12, 18 v 69
 A-774. Derby, 14 v 69
 A-775. Near Mt. Herbert, road to Gibb River, 15 v 69
 A-776. 91 mi E of jct. to Derby on Gibb River Road, 15 v 69
 A-777. 103 mi E of Derby jct., 67 mi W of Mt. House, 15 v 69
 A-778. 110 mi E of Derby jct., 60 mi W of Mt. House, 15 v 69

- A-779. 113 mi E of Derby jct., 57 mi W of Mt. House, 15 v 69
 A-780. 170 mi E of Derby jct., creek 0.3 mi E of Mt. House gate, 15 v 69
 A-781. 0.5 mi W of Mt. House gate, 15 v 69
 A-782. 4 mi W of Mt. House gate, 15 v 69
 A-783. 10 mi W of Mt. House, 15 v 69
 A-784. 19 mi W of Mt. House, 15 v 69
 A-785. 23 mi W of Mt. House, 15 v 69
 A-786. 26 mi W of Mt. House, 15 v 69
 A-787. 29.8 mi W of Mt. House, 15 v 69
 A-788. 30 mi W of Mt. House, 15 v 69
 A-789. 35 mi W of Mt. House, 15 v 69
 A-790. 37 mi W of Mt. House, 15 v 69
 A-791. 41 mi W of Mt. House, 15 v 69
 A-792. 47 mi W of Mt. House, 15 v 69
 A-793. 56 mi W of Mt. House, 15 v 69
 A-794. 66 mi W of Mt. House, 15 v 69
 A-795. 72 mi W of Mt. House, 15 v 69
 A-796. 82 mi W of Mt. House, 15 v 69
 A-797. 88.5 mi W of Mt. House, Lennard River, 15 v 69
 A-797.5. 5 mi NW of Winjana Gorge, 16 v 69
 A-798. Winjana Gorge, 16 v 69
 A-799. 6 mi SE of Winjana Gorge, 16 v 69
 A-800. 10 mi SE of Winjana Gorge, 16 v 69
 A-801. 25 mi SE of Winjana Gorge, 16 v 69
 A-802. 35 mi SE of Winjana Gorge, 16 v 69
 A-803. 43 mi SE of Winjana Gorge, 16 v 69
 A-804. 45 mi SE of Winjana Gorge, 16 v 69
 A-805. 49 mi SE of Winjana Gorge, 16 v 69
 A-806. 10 mi NW of Leopold Downs, 16 v 69
 A-807. 3 mi NW of Leopold Downs, 16 v 69
 A-808. 3.5 mi NW of Leopold Downs, 16 v 69
 A-809. 11 mi S of Leopold Downs, 16 v 69
 A-810. 19 mi S of Leopold Downs, 16 v 69
 A-811. 22 mi S of Leopold Downs, 16 v 69
 A-812. 29 mi W of Fitzroy Crossing, 16 v 69
 A-813. 21 mi W of Fitzroy Crossing, 16 v 69
 A-814. 10 mi W of Fitzroy Crossing, 16 v 69
 A-815. Fitzroy Crossing, 16 v 69
 A-816. Creek Ford at Route 1 near Fitzroy Crossing, 16 v 69
 A-817. 28 mi W of Halls Creek, 17 v 69
 A-818. Halls Creek, 17 v 69
 A-819. 1 mi W of Halls Creek, 17 v 69
 A-820. 3.5 mi W of Halls Creek, 17 v 69
 A-821. 6.8 mi W of Halls Creek, 17 v 69
 A-822. 7.3 mi W of Halls Creek, 17 v 69
 A-823. 10.6 mi W of Halls Creek, 17 v 69
 A-824. 20.7 mi W of Halls Creek, 17 v 69
 A-825. 21.3 mi W of Halls Creek, 17 v 69
 A-826. 22.2 mi W of Halls Creek, 17 v 69
 A-827. 23.8 mi W of Halls Creek, 17 v 69
 A-828. 27.5 mi W of Halls Creek, 17 v 69
 A-829. 28.8 mi W of Halls Creek, 17 v 69
 A-830. 33.8 mi W of Halls Creek, 17 v 69
 A-831. 42.3 mi W of Halls Creek, 17 v 69
 A-832. 52.5 mi W of Halls Creek, 17 v 69
 A-833. 64 mi W of Halls Creek, 17 v 69
 A-834. 71.2 mi W of Halls Creek, 17 v 69
 A-835. 86.5 mi W of Halls Creek, 17 v 69

- A-836. 100 mi W of Halls Creek, 17 v 69
 A-837. 111 mi W of Halls Creek, 17 v 69
 A-838. 120 mi W of Halls Creek, 17 v 69
 A-839. 130 mi W of Halls Creek, 17 v 69
 A-840. 140 mi W of Halls Creek, 17 v 69
 A-841. 150 mi W of Halls Creek, 17 v 69
 A-842. 160 mi W of Halls Creek, 17 v 69
 A-843. 170 mi W of Halls Creek, 17 v 69
 A-844. 180 mi W of Halls Creek, 17 v 69
 A-845. 190 mi W of Halls Creek, 17 v 69
 A-846. 4.5 mi W of Fitzroy River, 18 v 69
 A-847. 12.5 mi W of Fitzroy River 18 v 69
 A-848. 20 mi W of Fitzroy River, 18 v 69
 A-849. 30 mi W of Fitzroy River, 18 v 69
 A-850. 40 mi W of Fitzroy River, 18 v 69
 A-851. 50 mi W of Fitzroy River, 18 v 69
 A-852. 60 mi W of Fitzroy River, 18 v 69
 A-853. 70 mi W of Fitzroy River, 18 v 69
 A-854. 80 mi W of Fitzroy River, 18 v 69
 A-855. 90 mi W of Fitzroy River, 18 v 69
 A-856. 100 mi W of Fitzroy River, 18 v 69
 A-857. 230 mi S of Broome, 19 v 69
 A-858. 142 mi S of Broome, 19 v 69
 A-859. 150 mi S of Broome, 19 v 69
 A-860. 158.6 mi S of Broome, 19 v 69
 A-861. 170 mi S of Broome, 19 v 69
 A-862. 180 mi S of Broome, 19 v 69
 A-863. 190 mi S of Broome, 19 v 69
 A-864. 192.4 mi S of Broome, 19 v 69
 A-865. 193.9 mi S of Broome, 19 v 69
 A-866. 200 mi S of Broome, 19 v 69
 A-867. 210 mi S of Broome, 19 v 69
 A-868. 220 mi S of Broome, 19 v 69
 A-869. 240 mi S of Broome, 19 v 69
 A-870. 250 mi S of Broome, 19 v 69
- A-871. 260 mi S of Broome, 19 v 69
 A-872. 270 mi S of Broome, 19 v 69
 A-873. 280 mi S of Broome, 19 v 69
 A-874. 290 mi S of Broome, 19 v 69
 A-875. 300 mi S of Broome, 19 v 69
 A-876. 310 mi S of Broome, 19 v 69
 A-877. 320 mi S of Broome, 19 v 69
 A-878. 330 mi S of Broome, 19 v 69
 A-879. 339 mi S of Broome, DeGrey River, 19 v 69
 A-880. Carlindi Creek, 69 mi N of Marble Bar, 20 v 69
 A-881. Pear Creek, 41 mi N of Marble Bar, 20 v 69
 A-882. Coongan River, 27 mi N of Marble Bar, 20 v 69
 A-883. Marble Bar, 20 v 69
 A-884. 1 mi E of Marble Bar, 20 v 69
 A-885. 7 mi E of Marble Bar, 20 v 69
 A-886. 15 mi E of Marble Bar, 20 v 69
 A-887. 23 mi E of Marble Bar, 20 v 69
 A-888. 33 mi E of Marble Bar, 20 v 69
 A-889. 41 mi E of Marble Bar, 20 v 69
 A-890. 30 mi N of Nullagine, 20 v 69
 A-891. 26 mi N of Nullagine, 20 v 69
 A-892. 20 mi N of Nullagine, 20 v 69
 A-893. 10 mi N of Nullagine, 20 v 69
 A-894. 7 mi N of Nullagine, 20 v 69
 A-895. Nullagine, river, 20 v 69
 A-896. 10 mi S of Nullagine, 20 v 69
 A-897. 26 mi S of Nullagine, 20 v 69
 A-898. 38 mi S of Nullagine, 20 v 69
 A-899. 39 mi S of Nullagine, 20 v 69
 A-900. Mundiwindi, 21 v 69
 A-901. 10 mi S of Mundiwindi, 21 v 69
 A-902. 20 mi S of Mundiwindi, 21 v 69
 A-903. 25 mi S of Mundiwindi, 21 v 69
 A-904. 26 mi S of Mundiwindi, 21 v 69
 A-905. Kumarina, 21 v 69

SONG CHARACTERISTICS

TAPE RECORDING AND SONG ANALYSIS

Songs were taped, almost entirely in the field, with a Nagra III Tape Recorder using a tape speed of 15 inches per second and an American Microphone Company D-33 Dynamic microphone. All tape-recorded sounds were analyzed initially by listening to normal speed and one-fourth speed playbacks and using a stopwatch to time the various parameters described in the song. Subsequently, audiospectrograms were made of all taped songs with a Kay Electric Company Vibralyzer, and from these were selected samples for each species to be reproduced in the song plates. In general, we attempted to use recordings made at comparable tem-

peratures for those species where songs are most likely to be compared directly. The audiospectrographs and the tapes are on file in The University of Michigan Museum of Zoology.

Unless otherwise indicated, the term *pulse* refers to a group of toothstrokes, generally caused by one closing stroke of the forewings in crickets. Any short group of pulses, simple or complex, is usually referred to as a *chirp*, any long group or indefinitely long series of pulses as a *trill*; the boundary between chirps and trills is somewhat indefinite and unimportant. *Song* usually means a group or sequence of chirps or trills.

For ease in comparison all pulse rates are given

in pulses per second, even when this actually represents a projected rate based on the interval between two pulses or a few pulses produced together. In regard to analyses of audiospectrograms, the following definitions apply:

Rate means number of pulses, chirps, or trills per second, minute, or other unit of time; it involves measurements of distance (time) from the *beginning of one sound unit to the beginning of the next sound unit*.

Interval means distance (time) from the *end of one sound unit to the beginning of the next sound unit*.

Duration means distance (time) from the *beginning of a sound unit to the end of the same sound unit*.

Unless a sample size is given, most often only one measurement was used to derive the figures provided. What this actually means, in terms of our analysis procedure, is that unless variability was detectable we did not bother with additional measurements. In measuring pulse rates or chirp rates, we counted pulses or chirps for a few seconds, or for the length of one chirp or trill. In general, therefore, the song parameters for which a single measurement is given are the least variable ones in the stridulatory pattern.

Nearly all temperatures were taken in the field and ought not to be considered as accurate reflections of the body temperatures of the stridulating insects. Microclimatic variations, such as between air temperature and the temperature in soil cracks or burrows, particularly early in the evening, may be great. Air temperature and body temperature may differ greatly during sunny days. Most often we used a single temperature for each recording locality, taken about one foot above the ground. Exceptions are indicated in the text. Generally speaking, a qualification of $\pm 2^{\circ}\text{C}$ probably reflects the approximation of the field temperatures given.

Word descriptions of songs in the text are generally based on a $\frac{1}{4}$ speed listening analysis of the taped song of the first individual recorded, adjusted and enlarged from later study of audiospectrograms, and usually from analysis of songs of other individuals taped subsequently. Little attempt was made to describe comprehensively intraspecific variations in song parameters unless these seemed

unusual in some regard or threatened to overlap or cause confusion with songs of some other species. This "typological" approach has been necessary because of the introductory nature of this study and its emphasis on the species level. In spite of much recent (and generally justifiable) derogation of this kind of generalization in favor of something called "population thinking," it remains the basic method by which humans organize complexity so that it can be comprehended; especially in the case of biological diversity it must always be the fundamental procedure in introductory and species-cataloguing efforts. The species concept itself is "typological," in the sense that it focuses attention upon entities that, despite any internal variability, represent genetic islands or evolutionary discontinuities. For systematists, the chief danger lies in relying upon characters which in themselves do not exemplify discontinuities between species.

SINGING BEHAVIOR

With certain significant exceptions, Australian crickets tend to sing only at night. As in North America, restriction to night-singing is more characteristic of tree-inhabiting species, probably owing to bird predation. In both places, burrowing and surface species are more likely to sing in the daytime.

Crickets living in Australia's coldest and wettest climates also tend to sing in the daytime. On Tasmania in early April some *Bobilla* species sang entirely by day, and *T. commodus* was heard only once at night. Nocturnal temperatures were low, but generally above 50°F , the approximate lower limit for singing Orthoptera in general.

Only certain species of Mogoplistinae are exceptions to the rule that non-Bassian species are chiefly or strictly nocturnal. Members of the mogoplistine genus *Kalyra*, which we took from Mt. Tambourine north to just north of Townsville, seemed to sing only by day, even on Magnetic Island. Significantly, they live on the ground in the bases of grass clumps. Many species of *Eurepa*, *Eurepella*, *Arilpa* and *Salmanites* begin singing from sometime around mid-day until late afternoon, and many of them also continue far into the night, though perhaps terminating song generally ahead of the more strictly nocturnal crickets.

SONG PATTERNS

One might predict that in regions where relatively large numbers of cricket species have coexisted for a long period, song patterns would tend to be more complex than in regions that have always had few cricket species. Australian cricket songs seem to reinforce this suggestion, for not only are the patterns highly diverse compared to North America and Europe, but they include numerous species complexities. Patterns involving more than one pulse rate, tertiary and even quaternary hierarchies of intervals, and accelerating pulse sequences are common. Furthermore, such complexities are prevalent in genera or groups with large numbers of species, such as the Mogoplistinae, *Eurepa*, *Salmanites*, and *Comidogryllus* and related Gryllinae. *Teleogryllus*, with only three Australian species but complex song patterns, might seem contradictory, but all analyzed songs of species in this genus from Japan, Africa, and Australia have similar patterns, indicating that this complexity antedates appearance of the genus in Australia.

One might also predict that songs would be more distinctive from species to species in regions with many singing species. By another argument, however, they should be most distinctive in regions with few species because divergence between any particular pair of songs can continue farther in most

cases before counteracted by disadvantageous proximity to the songs of additional species. It is difficult to draw any firm conclusions on this question.

ANIMALS SOUNDING LIKE CRICKETS

1. Northern Queensland nightjar (mole cricket)

We established that the above nightjar was not a mole cricket only after considerable effort, by surprising a singer in mid-chirp. These birds seemed to "mimic" mole crickets while sitting on bare soil in open areas. The work of Ulagaraj and Walker (1973), showing that mole crickets orient acoustically during flight, causes us to suspect that mole crickets may be a principal food of some Australian nightjars.

2. Northern Queensland rainforest cicada singing at dusk (mole cricket)

3. *Bufo marinus* (mole cricket)

4. Several species in a genus of Pseudophyllinae, all with high-pitched songs in trees in northern Queensland

5. A pseudophylline from Western Australia

6. A Queensland rainforest frog

7. A Northern Territory frog

8. A Western Australian bird (Mogoplistinae)

9. A New South Wales–Queensland bird (Mogoplistinae)

MORPHOLOGICAL CHARACTERISTICS

MEASUREMENTS

Measurements were made with ocular micrometers in a binocular dissecting microscope or a binocular compound microscope (stridulatory file only).

Body length is measured from the front of the head to the tip of the subgenital plate. Forewing (FW) and hindwing (HW) length are measured from the posterior margin of the pronotum. Greatest width of dorsal field of FW is measured with FW on specimen. Head width is the maximum width measured from above, including the compound eyes if that is the widest measurement. Head length is measured dorsally with the pronotal surface ver-

tical to the microscope unless otherwise specified. Face width is widest width, viewed anteriorly; face length is from top of head to tip of labrum. Pronotal height is measured laterally, the posterior height measured sufficiently anteriorly to make it reasonably unequivocal. Ocellar diameters are smallest and largest diameters, measured with the ocellar surface horizontal to the microscope unless otherwise specified. Pronotal length is measured along center line. Pronotal width is the maximal width unless anterior or posterior margin is specified. Rostral width is narrowest width beyond where sides of rostrum cease converging, unless otherwise specified. Interantennal distance is shortest dis-

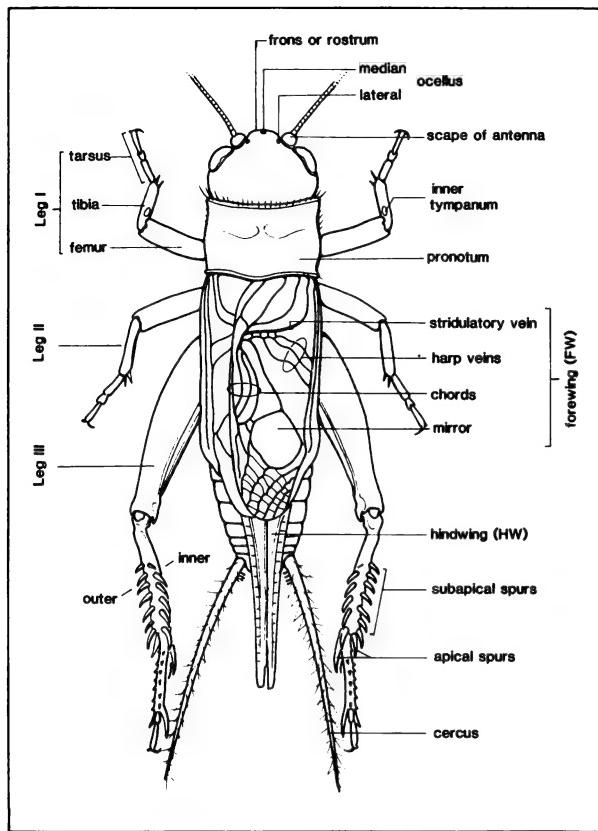


FIG. 2. Principal morphological features of Gryllidae.

tance between antennal sockets. Width of basal antennal segment is at widest point.

Tibial length does not include spurs. Tarsal length does not include claws, and is as if straight. Femoral width is greatest width. Cercal length is estimated as if cercus were straightened. Ovipositor length is measured in a straight line across the curve, if any. Ovipositor width is vertical height, measured from the side just distal to the swollen base where the ovipositor ceases to become more slender.

In counting file teeth, we have attempted to obtain the maximum number, including even small, peculiar, and widely spaced teeth. Checks indicate that errors of 1–2% ought to be assumed likely; differences of the same magnitude result from different interpretations by different persons of the poorly defined terminal teeth often present.

In counting numbers of teeth for a given length of the file, the microscope field was measured and

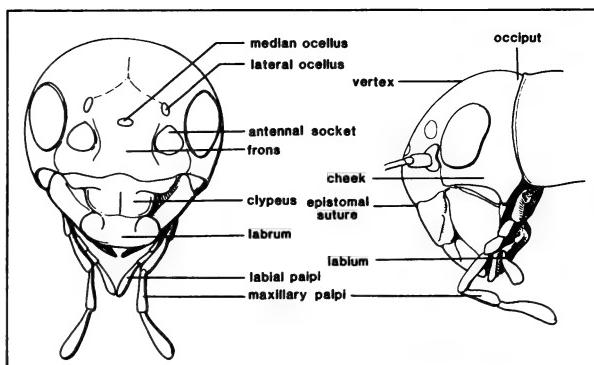


FIG. 3. Principal features of the cricket head.

the file adjusted so the maximum number of tooth edges, or crests, was visible in the part of the file being analyzed.

Other measurements are sufficiently unequivocal that they probably need no explanation. Our nomenclature of body parts and appendages is exemplified in Figs. 2–5.

SPURS AND SPINES

In our nomenclature, all movable projections are spurs, though they are called spines by Chopard and some other orthopterists. Spines, teeth, denticulations, and serrulations all refer to immovable projections (Torre-Bueno 1937; Borror and Delong 1971).

Spurs on tibia III may occur on both the inner and outer margins of the posterior surface and the apex (Fig. 5). Maximally, three outer and three inner spurs appear to be apical in most cases. Sometimes there is great difficulty in deciding whether a spur should be considered apical or subapical. Thus, in some genera of Gryllinae three internal spurs appear to be apical, the posterior pair much longer than either the anterior spur or the nonapical spurs. Externally, however, only the spur next to the anterior apical one is unusually long, and the third spur not only resembles the subapical spurs but appears slightly removed from the apical position. Yet if this spur is considered subapical, the external margin will contain one more subapical spur than the inner margin. It seems possible that the posterior outer apical spur has moved slightly and begun to function like the subapical spurs. Thus, the third outer apical spur sometimes is either absent or else it resembles the subapical spurs and

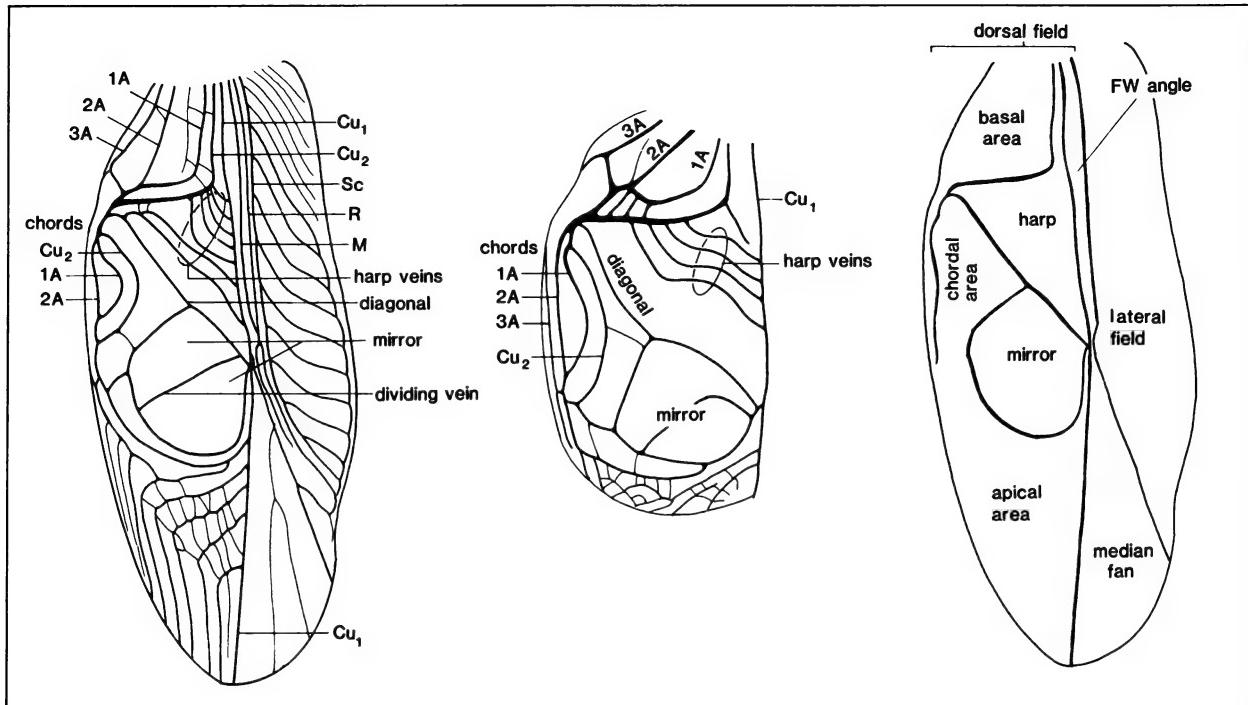


FIG. 4. Principal veins and divisions of cricket forewings.

is shifted proximally a little off the tibial apex. The easiest way to deal with this situation seems to be to assume six apical spurs in most cases, three outer and three inner, and to count all other spurs subapical. We have followed this procedure except that in some crickets, such as *Gryllotalpa inermis*, subapical spurs are absent and there are fewer than six apical spurs. In the New World genus *Neocurtilla*, there are seven spurs, all clustered at the apex of the tibiae.

CONDITION OF WINGS

Australian cricket wings vary as follows: (a) completely wingless in both sexes (e.g., some *Nemobiinae*, *Apterogryllus*, *Myrmecophilus*, *Arachncephalus*, and *Endotaria*) or in the female only (e.g., *Mogoplistinae*, some *Nemobiinae*, *Endacusta*, *Eurygryllodes*); (b) short forewings and no hindwings in both sexes (*Copholandrevus*); (c) females with shorter forewings than males, sometimes non-overlapping pads without hindwings (*Mjöbergella*, *Loxoblemmus*); (d) hindwings vary from being miniature (micropterous) through several intermediate conditions to being longer than the

forewings (macropterous) (*Gryllotalpa*, *Oecanthus*, *Pentacentrus*, *Anaxipha*, *Pteronemobius*, *Salmanites*, *Grylloides*, *Acheta*, *Lepidogryllus*, *Gymnogryllus*, *Teleogryllus*, *Eurepa*). In the last case the forewings are also somewhat longer when the hindwings are longer.

In *Teleogryllus* proportions of macropterous individuals vary within the species from occasional individuals, to low (*Teleogryllus commodus*) or high (*T. oceanicus*) percentages, and apparently in a few cases 100% of the individuals (*Cyrtoprosopus*). In some species females are macropterous in higher proportions than males.

Macropterousness in crickets, as well as other insects, is associated with life in temporary habitats and the selective value of being able to colonize new habitat as it appears and the old habitat deteriorates (Southwood 1962; Alexander 1968; Johnson 1969). Macropterous crickets often fly to lights in great numbers, becoming pestiferous in some cases. We collected pints of specimens of *Aritella* (Gryllinae) near lights in desert towns such as Richmond and Longreach, Queensland, either at night or during the day after they had flown in the pre-

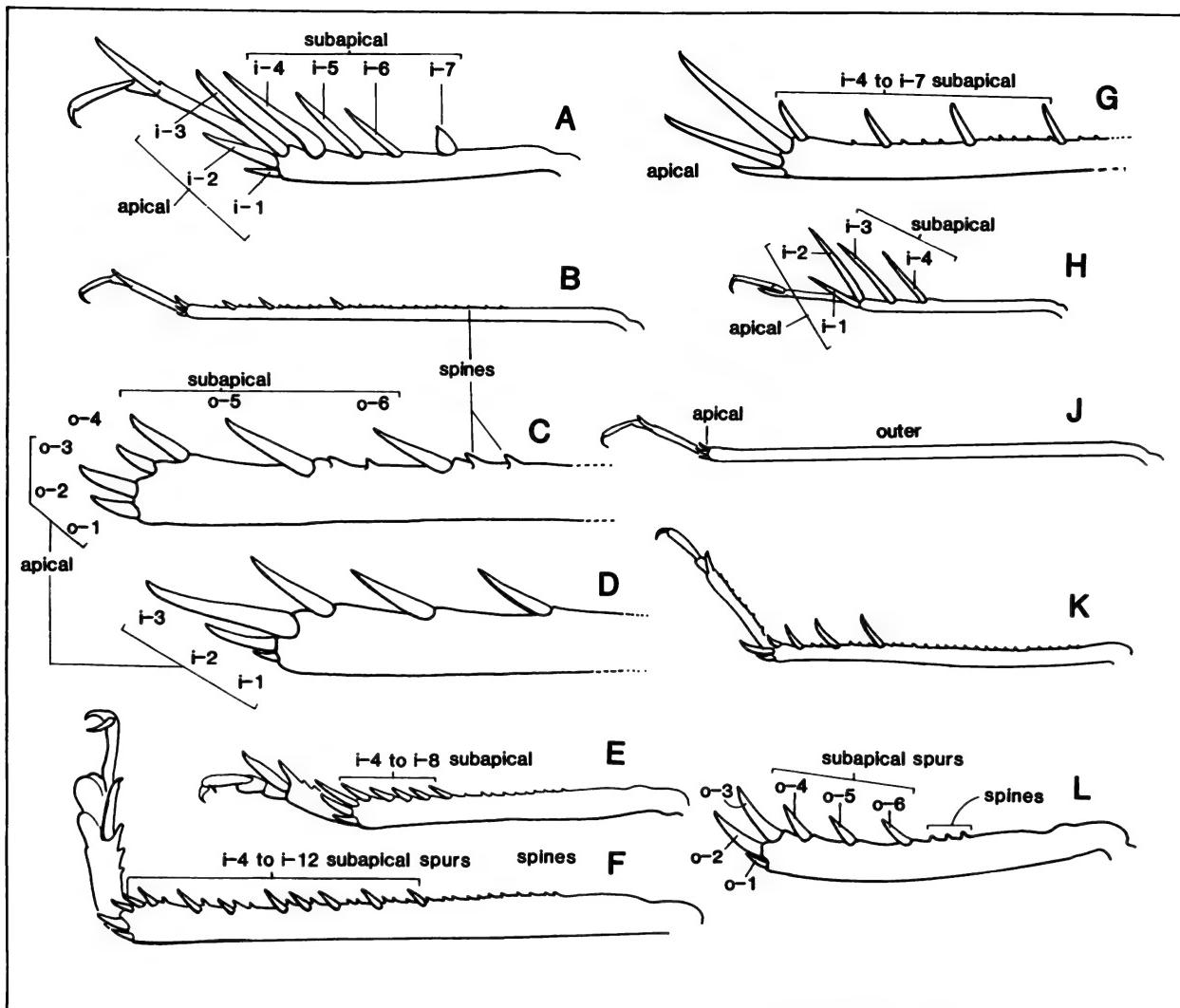


FIG. 5. Tibia III of various crickets (o = outer spurs, i = inner spurs). A, *Pteronemobius tarrios*; B, *Oecanthus angustus* (outer); C, *Aphonoides australis* (outer); D, *Aphonoides australis* (inner); E, *Riatina frontalis*; F, *Tamborina manilla*; G, *Endacusta major*; H, *Apteronomobius darwini*; J, *Xabea*; K, *Endacusta major*; L, *Apterogryllus bimbbios*.

vious nights. At night on the desert near Richmond with lights off we could see against the night sky large numbers of members of the same genus flying two or three meters above the ground.

Unlike grasshoppers (Caelifera) (Kevan 1954), crickets do not seem to show a relationship between the length of the forewings and the condition of the auditory tympanum, when a functional stridulatory device is present.

Some macropterous crickets apparently shed their long hind wings after being adult for some (unknown) period (Walker 1972). In some cases, at least, the hind wings are pulled off and eaten by

other crickets; thus, a female of *Gryllus bimaculatus* was observed in the laboratory by Alexander (unpublished) to emerge from a burrow and pull off one hind wing of a male courting her, back into the burrow again, eat the wing, emerge, and do the same with the still courting male's other hindwing. In our accounts such de-alated crickets are not distinguished from micropterous individuals.

Probably all species in which the hind wings project beyond the forewings occasionally disperse by flying. In some Tettigoniidae (species of *Orchelimum*) in which the hindwings project slightly or considerably beyond the forewings, the less mac-

ropterus individuals are able to take only short flights of a few meters off the tops of low vegetation while those with longer wings can sustain themselves in much longer flights (Thomas and Alexander 1962). No investigator, however, has reported seeing the very common Australian field cricket, *Teleogryllus commodus*, in flight although the condition of its wings would suggest such behavior, and we have heard and seen several macropterous adults on concrete sidewalks under lights with no grass within a block or more in downtown Melbourne. Whether or not such an economically important species can reinvade areas from which it has been eliminated may be important in determining the kinds of control attempted.

The general direction of evolution of wing lengths in crickets will always be toward reduction when flying capability has been lost by the species (excepting other functions such as stridulation or protective covering). In several almost universally micropterous species, however, such as *Miogryllus verticalis* and *Gryllus fultoni* in North America, *Gryllus campestris* in Europe, and the cosmopolitan *Gryllodes sigillatus*, ability is retained in some individuals to produce occasional macropterous offspring under certain conditions (McFarland 1966; Alexander 1968). Such species might give the appearance of having lost flight capability but nevertheless be capable of regaining full macropterousness and long-range flying capability if nomadism became advantageous.

One of the more interesting and diverse combinations of morphological features in the Gryllidae is that exemplified by the stridulatory apparatus and the tibial auditory organ. These two devices are the signal-producer and -receiver, respectively, in the major acoustical communicative system of the

Gryllidae. In general, they seem to change together in the course of evolution, and neither seems to correlate with any other morphological structure or condition, though species that burrow (*Mjöbergella*, some *Eurygryllodes*) or live in tight groups on plant stems (some Trigonidiinae and Pososcirtinae) are more likely to possess auditory tympana only on the inner faces of the tibiae.

These two devices are shared by the Gryllidae with the Tettigoniidae and certain Stenopelmatidae, although Ander (1939) has argued on the basis of internal differences in the auditory tympana that they originated separately in the Gryllidae. Alexander (1962, 1966, 1967) supposed that the complexity and general similarity of both devices throughout the Ensifera argue for a common origin and that their coordination in communication suggests that the tympana evolved after the tegminal signalling device became capable of producing significant contact vibratory signals. The presence in cockroaches of courtship wing-lifting and vibration resembling that of Ensifera supports this argument. But the presence of tibial tympana in certain Stenopelmatidae (species of *Australosoma*, *Penalva*) in which the male tegmina have the large number of major longitudinal veins probably primitive in Ensifera raises a problem. We do not yet know the functional significance of the tympana in these insects, nor has any function other than reception of tegminal stridulatory signals been suggested for any Ensifera. It seems possible, however, that once the stridulum is lost on the male forewing, the forewing can evolve toward a venation like that of the female, which could have retained much of its primitive nature throughout the evolutionary elaboration and loss of the male stridulatory device.

GEOGRAPHY, ECOLOGY, AND LIFE CYCLES

GEOGRAPHIC DISTRIBUTION AND PROBABLE ORIGINS

It is reasonable to suppose that most Australian crickets reached the continent from New Guinea by way of the Torres Straits, both because of the proximity of New Guinea and because of the similarity of the two faunas. *Gryllodes* and *Acheta* were almost certainly introduced by man.

The vast majority of species occurs in the north-eastern part of the continent, probably as a combined effect of the proximity of New Guinea and the diversity and hospitality of habitats there. In a little over 30 fragments of rain forest from Iron Range to near Sydney we located approximately 100 cricket species, the largest numbers (30–40) in the northern coastal rain forests, with a rather

steady decline to the smallest number (one) in a montane southern forest.

It is the rainforest species which in the main show the greatest similarity to the New Guinea fauna. Because a large proportion of the Australian continent is ecologically divergent from most of New Guinea, it is not surprising that a large number of Australian desert and xeric habitat forms have become distinctive. Perhaps the fact that selection over most of the continent has differed so much from the parts of the continent near New Guinea, and perhaps more closely paralleled that on much of the xeric portions of the Asian and African continents, accounts in part for the interpretations of some investigators that the Australian fauna has closer affinities with the Asian and African fauna than with the Indonesian fauna. If so, one should expect to find instances of parallel evolution resulting in erroneous placement of species from the different continents into the same genera after superficial comparisons. Some cases, for example that involving African and South American desert field crickets in the genera superficially resembling *Eurygryllodes*, have been uncovered in this study.

The damp, cold, southeastern and southwestern portions of the Australian continent and Tasmania have only a few cricket species, mostly flightless, and they share many of these, reinforcing the common suppositions of a recent (Pleistocene) connection with Tasmania and a continuous band of similar vegetation across the now xeric central southern coast of Australia.

ECOLOGICAL DISTRIBUTION

Ecological distributions are difficult to characterize for crickets. Only an occasional species seems closely associated with a single plant species or genus, and such associations often seem related to something indirect, such as protection from predators; as a result such associations may disappear where jumbles of boulders or other kinds of protection are available.

Almost on the basis of overall geographic distribution, one can distinguish species' environs on a broad basis, such as arid eucalypt forest, rain forests, or beaches and tide-influenced locales. Particularly in the Northern Territory and northern Western Australia, the borders between strips and patches of black and red soil, which correlate with

visible and often striking changes in vegetation, mark dramatic changes in the cricket fauna.

Commonly, ecological characterization of vegetation inhabitants more effectively involves height above the ground than plant species. Some crickets seem consistently to seek the topmost foliage of the tallest trees or herbage available. Others live in the lower branches of the taller trees, near the underside of the canopy. Still others are most frequent in the foliage of saplings and small trees of the under-story. Others, such as *Madasumma*, live in low bushes, still others in tall grass. There are species that frequent the stems of low herbs near the ground, others that live chiefly in leaf trash and other debris; and of course, there are dozens of species that live chiefly in burrows or soil cracks.

Occasional groups of crickets, such as within the Phalangopsinae, are almost inevitably associated with rocks or with decaying logs. Some seem limited by the absence of heavy ground litter such as decaying leaves or grass.

Following Key's (1954) discussion of grasshopper distributions, it is easy to recognize both "drought-resistant" and "drought-evasive" (waterhole and streambank) cricket species distributed widely across the country. The Gryllotalpinae, Nemobiinae, and certain Gryllinae, for example, are usually limited to moist soil along watercourses, the margins of ponds, or along the seacoast.

Most of our impressions concerning ecological distributions rely heavily upon the locales from which the males sing. That this indicator is generally reliable is demonstrated by the frequent finding of both females and juveniles in the same locations.

Australian crickets live essentially everywhere, from burrows several feet deep in dry soil (*Apterogryllus*) or in mucky and almost aquatic conditions (*Gryllotalpa*, *Gymnogryllus*) to tunnels in rotten logs (*Mjöbergella*); in the bases of vegetation or in surface trash (Mogoplistinae, Nemobiinae, Gryllinae, *Lebinthus*, *Endacusta*); in ant nests (*Myrmecophila*); on grasses and herbaceous vegetation (*Oecanthus*, *Eurepa*, *Salmanites*, *Aphonoides*, *Euscyrtus*); under bark (*Myara*, *Riatina*, *Eurepa*); in undergrowth (*Paratrigonidium*, *Cardiodactylus*, Mogoplistinae); in the under-story (*Xabea*, *Amusurgus*, Mogoplistinae, Podoscirtini); and in the tops of tall trees (*Madasumma*, *Tamborina*, *Tremellia* and many unidentified species).

Many *Eurygryllodes* species live and sing under and around spinifex on the soil surface, while *Eurepella* species spend the day somewhere down inside the plant and sing on its tallest stems at night. Many *Endacusta* species characteristically live in or around rocks and in grottoes and caves. *Myrmecophila* species are apparently restricted to ant nests. *Mjöbergella* species live in tunnels excavated in fallen logs and dead standing trees. We found *Riatina* only once in what might be its usual habitat, bundles of flotsam left high in tree branches during floods. Species in two genera of Nemobiinae occur only in the tidal zone, and leap directly into the water and swim away from shore on the water's surface until lost from view. Some *Anaxipha* species are found on marsh or coastal grasses and other vegetation over water.

A surprising aspect of the ecology of Australian crickets is the paucity of species living characteristically in *Eucalyptus* and *Acacia* trees. Although as presently defined these two genera contain more than 1000 species, and are the dominant forms in xeric forests across the continent, only a handful of cricket species of Mogoplistinae and Podoscirtinae are commonly found living in them. Possibly there are no crickets characteristic of or restricted to these large groups of tree species. The reasons are unclear, although contributing factors can be conjectured, such as intensive bird predation in these open, sparsely foliated situations, and the essential absence of aphids upon which some crickets feed.

LIFE CYCLES

The brevity of our field work in Australia and the small number of locales in which we worked continuously for long periods precluded the gathering of extensive data on life cycles. In the main we were able only to obtain hints about seasonality of adults and to notice groups or areas of probable interest in this connection. Thus, in the Northern Territory we wondered if some of the wingless burrowing species of *Apterogryllus* might not undergo juvenile diapauses induced by drought and spend long periods—perhaps more than a year in some cases—several feet below the soil surface. One might postulate that long life cycles such as are characteristic of cicadas all over the world may have evolved in circumstances such as these, where optimal breeding conditions occur at irregular and

sometimes long intervals rather than each year at a particular time and associated with similar seasonal changes each time. These seem optimal conditions for the evolution of diapauses that can be prolonged for varying periods to suit conditions.

In northern Queensland we were surprised at the adult seasonality of many species living in rain forests, even coastal rain forests at low elevations in which rainfall variations are relatively slight. Perhaps some of these species are derived from ancestors living in xeric or montane regions nearby, where moisture and temperature vary considerably and regularly during the year.

We also noted that in many cases, such as *Oecanthus* species living on grasses and possibly *Ornebius* species on various kinds of vegetation, crickets living in northern xeric habitats appear to be present as adults most or all of the time, increasing their singing and presumably their sexual activity during the rainy seasons. Probably these crickets have much longer adult lives than species living in temperate climates, and these long-lived adults are able to adjust their level of sexual activity to match changes in the suitableness of the weather for oviposition and the onset of juvenile life (see also Alexander 1968).

In southern climates, apparently both egg diapause (e.g., *Teleogryllus commodus*) and juvenile diapause (e.g., probably *Buangina diminuens*) occur, although the suggestion of juvenile diapause is only an inference, based on the presence of adults only in early summer just north of Melbourne. We found no indications of life cycle differences between closely related species.

ECONOMIC IMPORTANCE

Except for Tindale's (1928) mention of damage to nursery seedlings near Adelaide by the mole cricket, *Gryllotalpa oya*, and the obvious nuisance effects of dispersing field crickets (various genera of Gryllinae) in arid regions, the only significant destructiveness reported for Australian crickets appears to be their effects on range grass during drought (Browning 1952; Hogan 1960). In southern locales the chief species involved is *Teleogryllus commodus*. Through the kindness of T. W. Hogan, we were able to observe paddocks in Victoria in which dense populations of these species had effec-

tively destroyed the grass within a few centimeters of soil cracks. Soil cracks are often numerous and close together and the effect of dense cricket populations can be great, particularly since drought increases the number of soil cracks, leading both to desiccation of the grasses and the harboring of very high populations of crickets. The crickets thus have

their most important effects just when the grass is already under the most severe stress. The extent to which species of other genera of Gryllinae than *Telogryllus* are involved in range damage in some localities is unknown. These crickets, however, occur in dense populations only north of the regions where *T. commodus* is most abundant.

GLOSSARY AND ABBREVIATIONS

Museum abbreviations are found in the acknowledgments.

A-1, A-2, etc. Australian collecting, taping, or listening sites (see Fig. 1).

basal area of FW. Fig. 4.

basitarsus (BTS). First or most proximate tarsal segment.

BTS. Basal tarsal segment.

chirp. Any short group of pulses (see trill).

chirp rate (ch/s). Number of chirps per second.

chords. Posterior veins on male FW (Figs. 2, 4), = veins 1A, 2A, 3A, Cu₂.

ch/s. Chirps per second.

clypeus. See Fig. 3. The clypeus sometimes extends onto the dorsum of the head (Mogoplistinae, some Eneopterinae).

dorsal field of FW. Upper flat horizontal surface of FW.

epiphallus. Uppermost prominent part of male genitalia.

femur I, II, III. Front, middle, and hind femur (Fig. 2).

frons. Front of head, region above clypeus and between the bases of the antennae.

FW (FW's, plural). Forewings (tegmina of most authors).

harp. Section of male FW (Figs. 2, 4).

HS. Homestead.

HW (HW's, plural). Hindwings (wings of most authors).

KHz. Measure of sound frequency or pitch, kilohertz or kilocycles per second.

Kps. Kilocycles per second, same as KHz.

lateral field of FW. Vertical side of FW (costal and subcostal area).

lateral lobe. The two lateral, vertical sides of the pronotum.

leg I, II, III. Front, middle and hind leg.

mirror. Section of male FW (Figs. 2, 4).

NSW. New South Wales.

NT. Northern Territory.

p/ch. Number of pulses in a chirp.

pronotal disk. The dorsal horizontal portion of the pronotum, connecting to the lateral lobes, the vertical portions.

p/s. Pulses per second.

p/tr. Number of pulses in a trill.

pulse. A group of tooth strikes, generally caused by one closing stroke of the FW's.

pulse rate (p/s). Number of pulses per second (p/s).

QLD. Queensland.

rostrum. Front of head, region between the bases of the antennae, also called the frons but called rostrum when the front of the head projects well anteriorly of the antennal sockets.

song. Usually means a group or sequence of chirps or trills.

sternite. One ventral segmental sclerite.

sternum. Ventral sclerites of body.

stridulation. Sound production by crickets produced by rubbing the under FW against a file on the under side of the upper FW.

stridulum. Stridulatory vein on male FW (Figs. 2, 4).

subgenital plate. Last ventral abdominal segment.

TAS. Tasmania.

tergite. One dorsal segmental sclerite.

tergum. Dorsal sclerites of body; in crickets usually referring to dorsal segments of abdomen.

trill. Any long group of or indefinitely long series of pulses (see chirp).

VIC. Victoria.

WA. Western Australia.

SPECIES LIST

Subfamily GRYLLINAE

Tribe GYMNOGRYLLINI

Gymnogryllus Saussure
 brevicauda (Chopard)
 corroboree n. sp.

Anurogryllus Saussure

Tribe CEPHALOGRYLLINI

Cephalogryllus Chopard

laeviceps Chopard

liaweeena n. sp.

wilya n. sp.

tundulla n. sp.

bangali n. sp.

mannena n. sp.

matakira n. sp.

mitanina n. sp.

- pentaringus* n. sp.
goondooloois n. sp.
belubulus n. sp.
kurringa n. sp.
tau n. sp.
mileurae n. sp.
Stenocephalus n. gen.
australicus (Chopard)
wirrensis n. sp.
aperensis n. sp.
bookandrini n. sp.
yungellus n. sp.
yarata n. sp.
mataris n. sp.
worinta n. sp.
yarrami n. sp.
patawilyis n. sp.
nintenta n. sp.
perrumbis n. sp.
wookatios n. sp.
Apterogryllus Saussure
palpatus (Chopard)
pedestris (Walker)
rimbjae n. sp.
yirrkalis n. sp.
bathurstis n. sp.
alkina n. sp.
brunnerianus Saussure
moomooma n. sp.
durakai n. sp.
ilga n. sp.
bimblios n. sp.
kanandah n. sp.
yuraraba n. sp.
coorani n. sp.
midgee n. sp.
nanango n. sp.
nyrang n. sp.
paranyrang n. sp.
neonyrang n. sp.
- Tribe GRYLLINI
- Teleogryllus** Chopard
commodus (Walker)
oceanicus (Le Guillou)
marini n. sp.
- Tribe LANDREVINI
- Mjöbergella** Chopard
macrocephala Chopard
warra n. sp.
- Copholandrevus** Chopard
australicus Chopard
- Tribe GRYLLOMORPHINI
- Eurygryllodes** Chopard
gorinuis n. sp.
yerramutta n. sp.
pina n. sp.
moordoolura n. sp.
wilwindri n. sp.
takanna n. sp.
- latipennis* Chopard
weetapoonis n. sp.
warrilla n. sp.
warrani n. sp.
diminutus Walker
buntinus n. sp.
maiartios n. sp.
kurrabi n. sp.
yoothapina n. sp.
wirangis n. sp.
Malua n. gen.
manmarris n. sp.
- Tribe MODICOGRYLLINI
- Comidogryllus** n. gen.
adina n. sp.
whyallus n. sp.
bilo n. sp.
billabongus n. sp.
ellerinus n. sp.
dallacheus n. sp.
binyaris n. sp.
jabbarupus n. sp.
marookus n. sp.
yingally n. sp.
Loxoblemmus Saussure
pallens (Serville)
nurroo n. sp.
- Lepidogryllus** n. gen.
parvulus (Walker)
comparatus (Walker)
- Birubia** n. gen.
mediocris (Mjöberg)
dummala n. sp.
illalonga n. sp.
gayandi n. sp.
- Buangina** n. gen.
diminuens (Walker)
kittana n. sp.
bogabilla n. sp.
scutellata (Chopard)
nullaga n. sp.
urunga n. sp.
anemba n. sp.
- Yarrita** n. gen.
pikiara n. sp.
fistulator (Saussure)
woomera n. sp.
caribonga n. sp.
- Aritella** n. gen.
ilya n. sp.
gurrinya n. sp.
fulviceps (Mjöberg)
cooma n. sp.
girralonga n. sp.
arilya n. sp.
chidnaria n. sp.
dumpalia n. sp.
munginea n. sp.
benganea n. sp.

- leengila* n. sp.
wurunga n. sp.
duldrana n. sp.
derrilinea n. sp.
murwillumba n. sp.
fabria n. sp.
curtipennis (Mjöberg)
ulmarra n. sp.
jamberoo n. sp.
laticaput (Chopard)
- Pictorina* n. gen.
bullawarra n. sp.
kobarina n. sp.
yerriyari n. sp.
wombalano n. sp.
rimbijae n. sp.
- Rufoccephalus* n. gen.
chindrinus n. sp.
garooris n. sp.
milyaroois n. sp.
mirretis n. sp.
- Apedina* n. gen.
ilari n. sp.
winbirris n. sp.
thurgonalae n. sp.
tingha n. sp.
mantunginea n. sp.
tarcoolina n. sp.
- Tumpalia* n. gen.
kattara n. sp.
ilindia n. sp.
marnlia n. sp.
gundialga n. sp.
tau n. sp.
yellena n. sp.
yurriyappa n. sp.
yootha n. sp.
ruficeps (Chopard)
- Cyrtoprosopus* Chopard
stramineus Chopard
- Gryllodes* Saussure
sigillatus (Walker)
- Acheta* Fabricius
domesticus (Linnaeus)
- Subfamily NEMOBIINAE
- Tribe PTERONEMOBIINI
- Pteronemobius* Jacobson and Bianchi
truncatus (Saussure)
tarrios n. sp.
unicolor Chopard
binnali n. sp.
ornaticeps Chopard
garrotis n. sp.
nundra n. sp.
regulus (Saussure)
gagooris n. sp.
arima n. sp.
warrakara n. sp.
- Tribe NEMOBIINI
- Bobilla* n. gen.
plurampe n. sp.
killara n. sp.
bivittata (Walker)
neobivittata n. sp.
bakali n. sp.
poene n. sp.
tasmani n. sp.
victoriae n. sp.
kindyerra n. sp.
- Specnia* n. gen.
grongrong n. sp.
wirrega n. sp.
- Tincanita* n. gen.
tewah n. sp.
- Silvinella* n. gen.
wirraninna n. sp.
heteropus (Walker)
- Nambungia* n. gen.
balyarta n. sp.
- Narella* n. gen.
tintinara n. sp.
- Tribe THETELLINI
- Thetella* n. gen.
oonoomba n. sp.
tarnis n. sp.
- Apteronomobius* Chopard
darwini n. sp.
- Subfamily TRIGONIDIINAE
- Amusurgus* Brunner
kanyakis n. sp.
angustus (Chopard)
fascifrons Chopard
tinka n. sp.
mubboonis n. sp.
nilarius n. sp.
minmirri n. sp.
noorundi n. sp.
hackeri (Chopard)
- Metiochodes* Chopard
tindalei Chopard
australicus Chopard
thankolomara n. sp.
- Cyrtoxiphoides* Chopard
leai Chopard
planifrons Chopard
- Anaxipha* Saussure
anaxiphoides (Chopard)
mjöbergi Chopard
longipennis Serville
tetyenna n. sp.
tooronga n. sp.
fuscocinctum (Chopard)
- Homoeoxipha* Saussure
lycoides (Walker)
- Metioche* Stål
vittaticollis (Stål)

- monteithi* n. sp.
baroalbae n. sp.
Parametioche n. gen.
rectinervis (Chopard)
Balamara n. gen.
marroo n. sp.
gidya n. sp.
albovittata (Chopard)
Trigonidomorpha Chopard
sjöstedti Chopard
ammonga n. sp.
Dolichoxipha Chopard
gracilipes (Chopard)
danbulla n. sp.
Trigonidium Rambur
australiana (Chopard)
canberraee n. sp.
parinervis (Chopard)
infuscata (Chopard)
lalwinya n. sp.
meekappa n. sp.
goobita n. sp.
bundilla n. sp.
amarina n. sp.
killawarra n. sp.
canara n. sp.
- Subfamily PENTACENTRINAE
Pentacentrus Saussure
velutinus Chopard
kakirra n. sp.
- Subfamily PHALANGOPSINAE
Endacusta Brunner von Wattenwyl
major Chopard
pindana n. sp.
minor Chopard
koonaldia n. sp.
irrorata (Saussure)
australis Saussure
tibooburra n. sp.
pardalis (Walker)
koolpinya n. sp.
paraboora n. sp.
kirrimurra n. sp.
mareeba n. sp.
mjöbergi Chopard
yarramani n. sp.
cocoparae n. sp.
morillum n. sp.
lilla n. sp.
minka n. sp.
eurimbula n. sp.
wolli n. sp.
cycloptera Chopard
- Tathra** n. gen.
tatiara n. sp.
purkabidni n. sp.
mungarina n. sp.
trawalla n. sp.
- lankellia* n. sp.
pyala n. sp.
amplipennis (Chopard)
bulburina n. sp.
oligoneura (Chopard)
pilipennis (Chopard)
Endotaria Chopard
aptera Chopard
taitpulluna n. sp.
yelta n. sp.
- Subfamily ENEOPTERINAE
Tribe ENEOPTERINI
Eurepa Walker
marginipennis (White)
yumbena n. sp.
tanderra n. sp.
eeboolaga n. sp.
nurndina n. sp.
wirkutta n. sp.
woortooa n. sp.
noarana n. sp.
quabara n. sp.
- Myara** n. gen.
unicolor (Chopard)
yurgama n. sp.
merimbula n. sp.
aperta n. sp.
mabanuria n. sp.
sordida (Walker)
wintrena n. sp.
yabmanna n. sp.
warratinna n. sp.
erola n. sp.
pakaria n. sp.
muttaburra n. sp.
- Eurepella** n. gen.
quarriana n. sp.
wanga n. sp.
mataranka n. sp.
waninga n. sp.
mjöbergi (Chopard)
tjairaia n. sp.
nakkara n. sp.
meda n. sp.
arowacka n. sp.
ballina n. sp.
kulkawirra n. sp.
torowatta n. sp.
lewara n. sp.
narranda n. sp.
moojerra n. sp.
jillangolo n. sp.
iando n. sp.
tinga n. sp.
oana n. sp.
budyara n. sp.
tumbumbia n. sp.
- Arilpa** n. gen.

- wirrilla* n. sp.
gidya n. sp.
binderia n. sp.
allara n. sp.
panaroo n. sp.
pitanee n. sp.
milkappa n. sp.
Salmanites Chopard
wittilliko n. sp.
taltantris n. sp.
noonamina n. sp.
noccundris n. sp.
peekarra n. sp.
terba n. sp.
poene n. sp.
ninbella n. sp.
allaris n. sp.
muralappi n. sp.
obscurifrons Chopard
alta n. sp.
iknurra n. sp.
Lebinthus Stål
miripara n. sp.
bifasciatus Chopard
Cardiodactylus Saussure
novaeguineae (Haan)
Tribe PODOSCIRTINI
Madassumma Walker
affinis Chopard
kanina n. sp.
jirranda n. sp.
ilima n. sp.
choota n. sp.
loorea n. sp.
malteea n. sp.
Tamborina n. gen.
ocellata (Chopard)
wypanda n. sp.
manilla n. sp.
australis (Walker)
imurana n. sp.
entrea n. sp.
pirra n. sp.
Riatina n. gen.
frontalis (Walker)
pilkena n. sp.
callosifrons (Chopard)
nangkita n. sp.
padiminka n. sp.
mundiwindi n. sp.
villosiceps (Chopard)
brevicauda (Chopard)
pulkara n. sp.
karralla n. sp.
Hemiphonus Saussure
continuus (Walker)
wilparina n. sp.
yinbilliko n. sp.
Mundeicus Chopard
longifemur (Chopard)
- nillanilla* n. sp.
tindalei Chopard
panimilli n. sp.
warringus n. sp.
brunneovariegatus (Chopard)
quinnia n. sp.
Aphonoides Chopard
australis (Walker)
miripara n. sp.
nepotinna n. sp.
angustissimus (Chopard)
debilis (Chopard)
lowanna n. sp.
weta n. sp.
weeronga n. sp.
biangri n. sp.
karumbae n. sp.
agantra n. sp.
hackeri Chopard
marika n. sp.
jimjimi n. sp.
binderi n. sp.
kaikai n. sp.
warratinna n. sp.
Umbulgaria n. gen.
ita n. sp.
hillimunga n. sp.
obscura (Chopard)
Unka n. gen.
boreena n. sp.
Euscyrtus Guérin
hemelytrus (Haan)
Merrinella n. gen.
tandanya n. sp.
winnunga n. sp.
elinya n. sp.
Turana n. gen.
pankurla n. sp.
aminya n. sp.
kiwani n. sp.
Tozeria n. gen.
muwitiwallina n. sp.
Patiscus Stål
australicus (Chopard)
Tribe ITARINI
Tremellia Stål
australis Chopard
Phaloria Stål
anapina n. sp.
Subfamily OECANTHINAE
Oecanthus Serville
rufescens Serville
angustus Chopard
adyeri n. sp.
Xabea F. Walker
leai Chopard
atalaia n. sp.
tumbarumba n. sp.
wyebi n. sp.
Subfamily CACHOPLISTINAE

- Cachoplistus* Saussure
brunnerianus Saussure
westwoodianus Saussure
- Subfamily MOGOPLISTINAE
- Ornebius* Guérin
wandella n. sp.
bambara n. sp.
elvalina n. sp.
coomialla n. sp.
allambi n. sp.
curtipalpis Chopard
kanya n. sp.
aperta n. sp.
immarna n. sp.
gumbalera n. sp.
illaroo n. sp.
attunga n. sp.
jatalinga n. sp.
lilka n. sp.
balumba n. sp.
oradala n. sp.
antakira n. sp.
dandiri n. sp.
jirira n. sp.
baloois n. sp.
kapunda n. sp.
yarandilla n. sp.
dirkanala n. sp.
abminga n. sp.
woomba n. sp.
coorumbena n. sp.
karkalo n. sp.
kalara n. sp.
nigromaculatus (Chopard)
- Lara* n. gen.
- kalimna* n. sp.
munbillia n. sp.
nimmitabel n. sp.
hackeri (Chopard)
natarina n. sp.
cowandilla n. sp.
- Collendina* n. gen.
- ora* n. sp.
fascipes (Chopard)
iterala n. sp.
elanora n. sp.
kira n. sp.
mamoura n. sp.
- Talia* n. gen.
- pitonga* n. sp.
bandumu n. sp.
brevithorax (Chopard)
- Maroa* n. gen.
- dardoana* n. sp.
australicus (Chopard)
alawara n. sp.
indiwarra n. sp.
- Marinna* n. gen.
- jerrima* n. sp.
mira n. sp.
bumboa n. sp.
iranda n. sp.
ulandi n. sp.
pangarinda n. sp.
pallida (Chopard)
ingooralala n. sp.
barinya n. sp.
arapala n. sp.
- Biama* n. gen.
- noccundra* n. sp.
larnoo n. sp.
coorari n. sp.
iloura n. sp.
allumba n. sp.
camira n. sp.
arupingi n. sp.
arila n. sp.
kantalpa n. sp.
atalumba n. sp.
joonaloona n. sp.
- Kalyra* n. gen.
- pillinda* n. sp.
mjöbergi (Chopard)
gililpi n. sp.
karka n. sp.
goparinga n. sp.
- Kiah* n. gen.
- palanu* n. sp.
karrawilya n. sp.
- Pongah* n. gen.
- indooroopilly* n. sp.
wanboo n. sp.
ilara n. sp.
- Arachnocephalus* Costa
australicus Chopard
- Subfamily GRYLLOTALPINAE
- Gryllotalpa* Latreille
monanka n. sp.
coarctata Walker
pilosipes Tindale
inermis Chopard
australis Erichson
brachyptera Tindale
babinda n. sp.
pluvialis Mjöberg
nitidula Serville
oya Tindale
- Subfamily MYRMECOPHILINAE
- Myrmecophilus* Latreille
- longitarsus* Chopard
mjöbergi Chopard
australis Tepper
parachilnus n. sp.
testaceus Chopard
tindalei n. sp.

CHANGES IN NOMENCLATURE: 1951 TO PRESENT¹

Chopard 1951		This work
<i>Apterogryllus rugosus</i>	n. syn.	<i>A. pedestris</i>
<i>Scapanonyx</i>	n. syn.	<i>Apterogryllus</i>
<i>Scapanonyx palpatus</i>	n. comb.	<i>Apterogryllus palpatus</i>
<i>Cephalogryllus australicus</i>	n. comb.	<i>Stenocephalus australicus</i>
<i>Cephalogryllus ruficeps</i>	n. comb.	<i>Tumpalia ruficeps</i>
<i>Anurogryllus</i>	not known from Australia	
<i>Gryllulus commodus</i>	Chopard 1968	<i>Teleogryllus commodus</i>
<i>Gryllulus oceanicus</i>	Chopard 1968	<i>Teleogryllus oceanicus</i>
<i>Gryllulus lepidus</i>	n. syn.	<i>Lepidogryllus parvulus</i>
<i>Gryllulus lineiceps</i>	n. syn.	<i>Lepidogryllus parvulus</i>
<i>Gryllulus fulviceps</i>	n. comb.	<i>Aritella fulviceps</i>
<i>Gryllulus comparatus</i>	n. comb.	<i>Lepidogryllus comparatus</i>
<i>Gryllulus scutellatus</i>	n. comb.	<i>Buangina scutellata</i>
<i>Gryllulus fistulator</i>	n. comb.	<i>Yarrita fistulator</i>
<i>Gryllulus flavispina</i>	<i>nomen dubium</i>	
<i>Gryllulus diminuens</i>	n. comb.	<i>Buangina diminuens</i>
<i>Gryllulus curtipennis</i>	n. comb.	<i>Aritella curtipennis</i>
<i>Gryllulus parvulus</i>	n. comb.	<i>Lepidogryllus parvulus</i>
<i>Gryllulus minusculus</i>	<i>nomen dubium</i>	
<i>Gryllulus subniger</i>	n. syn.	<i>Buangina diminuens</i>
<i>Gryllulus mediocris</i>	n. comb.	<i>Birubia mediocris</i>
<i>Gryllulus kempfi</i>	n. syn.	<i>Birubia mediocris</i>
<i>Gryllulus laticaput</i>	n. comb.	<i>Aritella laticaput</i>
<i>Gryllopsis armatipes</i>	n. syn.	<i>Aritella laticaput</i>
<i>Eugrylloides diminutus</i>	n. comb.	<i>Eurygrylloides diminutus</i>
<i>Nemobius bivittatus</i>	n. comb.	<i>Bobilla bivittata</i>
<i>Dictyonemobius heteropus</i>	n. comb.	<i>Silvinella heteropus</i>
<i>Dictyonemobius lateralis</i>	not Australian	
<i>Ornebius mjöbergi</i>	n. comb.	<i>Kalyra mjöbergi</i>
<i>Ornebius pallidus</i>	n. comb.	<i>Marinna pallida</i>
<i>Ornebius australicus</i>	n. comb.	<i>Maroa australicus</i>
<i>Ornebius brevithorax</i>	n. comb.	<i>Talia brevithorax</i>
<i>Ornebius denticauda</i>	<i>nomen dubium</i>	
<i>Ornebius laevicauda</i>	<i>nomen dubium</i>	
<i>Ornebius parvithorax</i>	<i>nomen dubium</i>	
<i>Ornebius hackeri</i>	n. comb.	<i>Lara hackeri</i>
<i>Ornebius latifrons</i>	<i>nomen dubium</i>	
<i>Ornebius parvus</i>	<i>nomen dubium</i>	
<i>Ornebius fascipes</i>	n. comb.	
<i>Pentacentrus australicus</i>	n. syn.	<i>Collendina fascipes</i>
<i>Endacusta pilipennis</i>	n. comb.	<i>Pentacentrus velutinus</i>
<i>Endacusta angulifrons</i>	not Australian	<i>Tathra pilipennis</i>
<i>Endacusta oligoneura</i>	n. comb.	
<i>Endacusta amplipennis</i>	n. comb.	<i>Tathra oligoneura</i>
<i>Paratrigonidium fuscocinctum</i>	n. comb.	<i>Tathra amplipennis</i>
<i>Metioche flavipes</i>	not Australian	<i>Anaxiphia fuscocinctum</i>
<i>Metioche bicolor</i>	not Australian	
<i>Metioche australiana</i>	n. comb.	
<i>Metioche parinervis</i>	n. comb.	<i>Trigonidium australiana</i>
<i>Metioche angusta</i>	n. comb.	<i>Trigonidium parinervis</i>
<i>Metioche infuscata</i>	n. comb.	<i>Amusurgus angusta</i>
<i>Metioche albovittata</i>	n. comb.	<i>Trigonidium infuscata</i>
<i>Metioche areolata</i>	n. syn.	<i>Balamara albovittata</i>
<i>Metioche rectinervis</i>	n. comb.	<i>Trigonidomorpha sjöstedti</i>
<i>Metiochodes hackeri</i>	n. comb.	<i>Parametioche rectinervis</i>
<i>Cardiodactylus gaimardi</i>	<i>nomen dubium</i>	<i>Amusurgus hackeri</i>

<i>Cardiodactylus canotus</i>	not Australian	
<i>Cardiodactylus rufidulus</i>	<i>nomen dubium</i>	
<i>Eurepa sordida</i>	n. comb.	<i>Myara sordida</i>
<i>Eurepa mjöbergi</i>	n. comb.	<i>Eurepella mjöbergi</i>
<i>Eurepa unicolor</i>	n. comb.	<i>Myara unicolor</i>
<i>Eurepa curvatifrons</i>	<i>nomen dubium</i>	
<i>Eurepa subaptera</i>	<i>nomen dubium</i>	
<i>Madasumma australis</i>	n. comb.	<i>Tamborina australis</i>
<i>Madasumma aperta</i>	<i>nomen dubium</i>	
<i>Madasumma ocellata</i>	n. comb.	<i>Tamborina ocellata</i>
<i>Madasumma obscura</i>	n. comb.	<i>Umbulgaria obscura</i>
<i>Madasumma planiceps</i>	<i>nomen dubium</i>	
<i>Madasumma hornensis</i>	<i>nomen dubium</i>	
<i>Madasumma reticulata</i>	<i>nomen dubium</i>	
<i>Madasumma continua</i>	n. comb.	<i>Hemiphonus continua</i>
<i>Dolichogryllus brunneovariegatus</i>	n. comb.	<i>Mundeicus brunneovariegatus</i>
<i>Hemiphonus vittatus</i>	n. syn.	<i>Hemiphonus continua</i>
<i>Hemiphonus vicinus</i>	n. syn.	<i>Hemiphonus continua</i>
<i>Hemiphonus frontalis</i>	n. comb.	<i>Riatina frontalis</i>
<i>Hemiphonus gracilis</i>	n. syn.	<i>Riatina brevicauda</i>
<i>Hemiphonus villosiceps</i>	n. comb.	<i>Riatina villosiceps</i>
<i>Hemiphonus callosifrons</i>	n. comb.	<i>Riatina callosifrons</i>
<i>Hemiphonus tuberculifrons</i>	n. syn.	<i>Riatina frontalis</i>
<i>Hemiphonoides armatus</i>	not Australian	
<i>Mundeicus brevicauda</i>	n. comb.	<i>Riatina brevicauda</i>
<i>Aphonoides lividus</i>	n. syn.	<i>Aphonoides australis</i>
<i>Aphonoides brevis</i>	<i>nomen dubium</i>	
<i>Adenopterus norfolkensis</i>	not Australian	
<i>Euscyrtus concinnus</i>	not Australian	
<i>Euscyrtus australicus</i>	n. comb.	<i>Patiscus australicus</i>
<i>Pareneopterus handschini</i>	<i>nomen dubium</i>	

¹ Ordered as in Chopard 1951.

KEY TO AUSTRALIAN SUBFAMILIES

As with generic keys the following key is designed to distinguish only the Australian members of each group and will not necessarily distinguish crickets from other regions.

- Front legs enlarged and shovel-like, much stouter than middle legs. Head horizontal, much narrower than pronotum and narrowing anteriorly toward mouth-parts (Fig. 347) **GRYLLOTALPINAE**
Front legs not enlarged and shovel-like, not noticeably stouter than middle legs. Otherwise not necessarily as above 2
- Femur III more than two-fifths as wide as long. Compound eyes reduced to clusters of fewer than 50 large, individually convex facets. Basitarsis III with 3 or 4 nonapical dorsal spurs (Fig. 357). Tiny, wingless insects living in ant nests (body length < 4 mm) (Fig. 356) **MYRMECOPHILINAE**
Femur III less than two-fifths as wide as long. Compound eyes with more than 50 facets, together forming one smoothly convex surface. Basitarsus III with two rows of dorsal denticles or no dorsal projections 3
- Body flattened and more or less covered with fine scales. Body length under 15 mm in length. Females wingless. Males usually with forewings partly covered by rearward extension of pronotum. Clypeus extending onto dorsum of head ... **MOGOLISTINAE**
Body lacking scales. Otherwise not necessarily as above 4
- Tibiae quadrate in cross section, with four angulate margins. Head no more than $\frac{5}{9}$ width of pronotum. Pronotum concave both dorsally and laterally, with prominent dorso-lateral carinae (Fig. 309). Large insects over 25 mm **CACHOPLISTINAE**
Tibiae not quadrate but rounded in cross section. Head including eyes more than $\frac{5}{9}$ width of pronotum. Pronotum never concave both dorsally and laterally. Otherwise not as above 5
- Head prognathous (Fig. 307). Tarsal claws bifurcate (Fig. 301) **OECANTHINAE**
Head not prognathous. Tarsal claws not bifurcate 6
- Tibia III with spines between most spurs (Fig. 5CFGK) 7
Tibia III without spines between spurs (Fig. 5AHL) 8

7. Tibia I and II strongly banded. Middle tarsal segment without prominent adhesive pads (Fig. 5K). Head with dorsal bristles. Females always wingless. Hind wings never apparent. Very long legged species in caves, rock faces, or on bases of tree trunks in rain forests PHALANGOPSINAE
- Tibia I and II usually unbanded or only faintly banded. Middle tarsal segments usually with prominent adhesive pads (Fig. 5F). Head usually without dorsal bristles. Females winged or wingless. Hind wings sometimes present and visible. A large group living on ground (*Salmanites*, *Lebinthus*, *Arilpa*), or on grasses (*Eurepa*, *Eurepella*, *Euscyrtus* group), or on stems or under bark (*Eurepa*, *Myara*, *Podoscirtini*), or on tree foliage (*Podoscirtini*) ENEOPTERINAE
8. Head with dorsal bristles. Tibia III always lacking spines between or above spines 9
- Head without dorsal bristles. Tibia III sometimes with spines between or above spines 10
9. Tibia III equal in length to femur III. Second tarsal segment dorsoventrally flattened and with prominent adhesive pad. Both sexes always with forewings. Tibia III always with 2–3 inner and outer subapical spurs, never 4. Tibia III always with 2 inner and 2 outer apical spurs. Vegetation inhabitants TRIGONIDIINAE
- Tibia III distinctly shorter than femur III. Second tarsal segment laterally compressed and without noticeable adhesive pad. One or both sexes with or without forewings. Tibia III with 2–4 inner and outer subapical spurs. Tibia III usually with 3 inner and 3 outer apical spurs. Ground or leaf litter inhabitants NEMOBIINAE
10. Tibia I with inner tympanum only. Male winged, without stridulum PENTACENTRINAE
- Tibia I with outer and inner tympana, or only with outer tympana, or without tympana, but never having inner tympana only GRYLLINAE

SUBFAMILY GRYLLINAE

This large subfamily of mainly ground and rock inhabiting crickets is represented by 23 genera in Australia. Two of the genera, *Acheta* and *Grylloides*, are probably introduced from outside of the continent, and *Anurogryllus*, though listed by Chopard, probably does not occur on the continent. Of the 21 native Australian genera 12 are new. Most of the new genera belong to the newly erected tribe Modicogryllini.

We have divided the Australian members of this subfamily into six tribes: Gymnogryllini, Cephalogryllini (new tribe), Gryllini, Landrevini (new tribe), Gryllomorphini, and Modicogryllini (new tribe). Diagnostic features of these tribes and the included genera are compared in Table 1.

RECOGNITION. Body length usually more than 15 mm. Dorsum of head always without prominent bristles. Tibia III with 3–7 inner and 3–7 outer subapical spurs and with 3 inner and 3 outer apical spurs. Tibia III usually without small spines, but when present (Landrevini, Gryllomorphini, some *Apterogryllus*) always proximal to and never between subapical spurs. Usually living on the ground, in soil cracks, in ground burrows, or in rock crevices.

KEY TO AUSTRALIAN GENERA OF GRYLLINAE

1. Tibia I without tympana 2
- Tibia I with tympana (inner, outer, or both) 4

2. Tibia III without short spines above subapical spurs *Apterogryllus* (part)
- Tibia III with one or more short spines above subapical spurs 3
3. Genitalia as in Fig. 53L. (Extreme southwestern WA) *Malua*
- Genitalia as in Figs. 32, 34. (Forests of Great Dividing Range of QLD and NSW) *Apterogryllus* (part)
4. Tibia III with short spines above spurs (Fig. 5L) 5
- Tibia III without short spines above spurs 7
5. Mirror large and usually divided by one vein (Fig. 52).
Male FW usually covering abdomen. Female without FW's. Grassland and desert species *Eurygryllodes*
- Mirror not large, or absent. Male FW very short or not reaching much beyond middle of abdomen. Females with short FW's. Rainforest species (Landrevini) 6
6. Males with stridulum and distinct harp. Males with inner tympanum only. Females with or without tympana. (Rain forests of N QLD) *Mjobergella*
- Males without stridulum or harp. Both sexes without tympana. (Rain forests of N QLD) *Copholandrevus*
7. Both sexes with long FW's with well-developed apical area (e.g., Figs. 6, 36). Tibia I with inner and outer tympana. Mirror divided by one vein; 3 to 4 harp veins 8
- Not possessing all of above combination of characteristics 10
8. Body length under 25 mm; straw-colored, with dark transverse bar between compound eyes (introduced: Adelaide region only) *Acheta*
- Body length over 25 mm; black, reddish, or brown, without transverse bar between eyes 9
9. Very large brown or reddish crickets. Occiput without longitudinal pale stripes. Ovipositor as long as pron-

TABLE I. Comparison of Australian members of Gryllinae. R, wet river banks or swampy ground; RF, rain forest; W, open, dry woodland; D, desert grassland and scrub; G, grasslands, open meadows; S, stony or rocky places (cracks); B, dry soil banks.

Tribe and Genus	Forewings present		Mirror: divided (d) undivided (u) absent (a)	Tympana: inner (i) outer (o) absent (-) (disregard size)	Femur III with spines above spurs	Number of harp veins	Usual habitats
	♂	♀					
GYMNOGRYLLINI							
<i>Gymnogryllus</i>	+	+	d	i/o	-	3	R
CEPHALOGRYLLINI							
<i>Cephalogryllus</i>	+	-	u ¹ or a	-/o	-	4-8 ⁴	RF, W
<i>Stenocephalus</i>	+	+	d	-/o	-	5-9	RF, W
<i>Apterogryllus</i>	-	-	wingless	-/-	+ or -	0	RF, W, D
GRYLLINI							
<i>Teleogryllus</i>	+	+	d	i/o	-	3-4	G
<i>Acheta</i>	+	+	d or u	i/o	-	3-4	near humans
LANDREVINI							
<i>Mjöbergella</i>	+	+	u or a	i ² /-	+	6-7	RF
<i>Copholandrevus</i>	+	+	a	-/-	+	0	RF
GRYLOMORPHINI							
<i>Eurygrylloides</i>	+	-	usually d	i/o ³	+ ⁵	3-7	D, G
<i>Malua</i>	-	-	wingless	-/-	+	0	G, W?
MODICOGRYLLINI							
<i>Comidogryllus</i>	+	+	u	i/o	-	2	RF, R, W, G
<i>Loxoblemmus</i>	+	+	d or u	-/o	-	2	W, R
<i>Lepidogryllus</i>	+	+	u	-/o or i ⁶ /o	-	2	R, G, W
<i>Birubia</i>	+	+	u	-/o	-	2	R, G, W
<i>Yarrita</i>	+	+	d or u	i/o or i ⁶ /o	-	2	G
<i>Buangina</i>	+	+	u ⁷	-/o	-	2	G, W
<i>Aritella</i>	+	+	d	-/o	-	2	W, G
<i>Pictorina</i>	+	+	u	-/o	-	2	W
<i>Rufocephalus</i>	+	?	u	-/o	-	2	S, B
<i>Apedina</i>	+	?	u	-/o	-	2	S, B
<i>Tumpalia</i>	+	+	a	-/o	-	2	G
<i>Cyrtoprosopus</i>	+	+	a	-/o	-	0-1	G
<i>Gryllodes</i>	+	+	d	-/o	-	2	S

¹ Divided in *mitanina*.

² Lacking in *macrocephala* ♀.

³ Absent in Warrilla Group.

⁴ 2-3 in *mileurae*.

⁵ Except in *E. wirangis*.

⁶ Obscure or rudimentary.

⁷ Sometimes with small veins inside mirror but always without a major dividing vein.

- tum or shorter. Head appearing short relative to pronotum. (Inhabiting wet river banks and swampy places in far northern Australia) *Gymnogryllus*
- Large black crickets. Occiput with 6 longitudinal pale stripes (Fig. 36). Ovipositor much longer than pronotum. Head not as above. (Grasslands and meadows through much of Australia) *Teleogryllus*
10. Small yellow crickets; male FW with 0-1 harp vein, no mirror; tibia I with outer tympanum *Cyrtoprosopus*
- Male FW with 2-9 harp veins; other attributes variable .. 11
11. Male FW's with 4-9 harp veins 12
- Male FW's with 2 (rarely 3) harp veins 13
12. Females with FW's. Mirror always present. Mirror always divided by one vein. Male FW 2.5-3.8 times as long as pronotum *Stenocephalus*
- Females without FW's. Mirror present or absent. Mirror not divided (except sometimes in *mitanina*). FW's 1.5-2.4 times as long as pronotum (2.9 in *mitanina* and 3.1 in *mileurae*) *Cephalogryllus*
13. Frontal rostrum between antennae about as wide as

scape; no inner tympanum; face not flattened (introduced; usually in or near cities) *Gryllodes*
 Frontal rostrum much wider than scape; otherwise not necessarily as above . MODICOGRYLLINI, part, p. 88

TRIBE GYMNOGRYLLINI

Genus *Gymnogryllus* Saussure

Gymnogryllus Saussure 1877: 123. Type species: *Gryllus elegans* Guérin in Bélanger 1834: 495, designation by Chopard 1967: 18.

The Australian *Gymnogryllus* are congeneric with the type species on the basis of the genitalia. The genus has 21 nominal species, two in Australia and the rest extending from Africa and India to New Guinea. Most are large burrowing species more or less intermediate in both body size and extent of burrowing tendencies between *Brachytrupes* and *Teleogryllus* or *Gryllus*. The two Australian species are loud trillers that live in mud of river banks and low swampy ground.

RECOGNITION. Fig. 6. Outer tympanum large and oval, inner tympanum small, round. Mirror well-developed and divided by one vein (Fig. 9). Harp with three veins. Tibia III with last (or ventralmost) apical spur very small compared to two preceding spurs. Pronotum with convex sides, relatively long, and wider than head. HW's often long and extending to end of abdomen or beyond. Apical area of FW very long.

brevicauda

1. Epiphallus with narrow U-shaped notch (Fig. 9B).
2. File with 66–77 teeth (n=5).

corroboree

1. Epiphallus with wide V-shaped notch (Fig. 9A).
2. File with 79–91 teeth (n=6).

Gymnogryllus brevicauda (Chopard), Fig. 9BDF

Gymnogryllus brevicauda Chopard 1937: 112. Holotype ♀. Marakai, v 1931 (Handschin). Chopard (in Litt) says type is at GM, but we did not find it there.

RANGE. Extreme northern NT and WA.

RECOGNITION. Males: Genitalia as in Fig. 9B. Wing venation as in Fig. 9D. Harp with 3 and occasionally 4 veins. File with 66–77 teeth (n=5). Body length 30 mm or more. Tibia III with 5–6 inner and 5 outer subapical spurs. Body color reddish-brown. Lateral lobes with pale band along lower

margin. Head 0.86 times as wide as greatest pronotal width. Shape of pronotum (top view) as in Fig. 6. Greatest pronotal width ca. 1.4 times median pronotal length. FW ca. 3.3 times as long as pronotum, and ca. 2.9 times as long as wide (dorsal field). FW ca. 1.15 times as long as femur III. Femur III ca. 1.6 times as long as tibia III, ca. 1.96 times as long as basitarsus III. Last outer apical spur small compared to those immediately preceding (Fig. 9F). Body length 30–35 mm; FW length ca. 20 mm; femur III length ca. 16 mm; cerci ca. 10 mm.

Females: Very similar to males in size and color (body length 34–37 mm). Ovipositor ca. 0.9 times as long as pronotum.

VARIATION. Some individuals are dark reddish-brown. Two males from A-767 had 73 and 66 file teeth. Three males from A-177 had 77, 68, and 72 teeth. Individuals from the Ord River are darker with the top of the head and pronotum nearly black.

SONG. Fig. 8. Very loud trill with very fast pulse rate.

	p/s	kps	°C
A-767	125–127	5.4–5.9	22.8

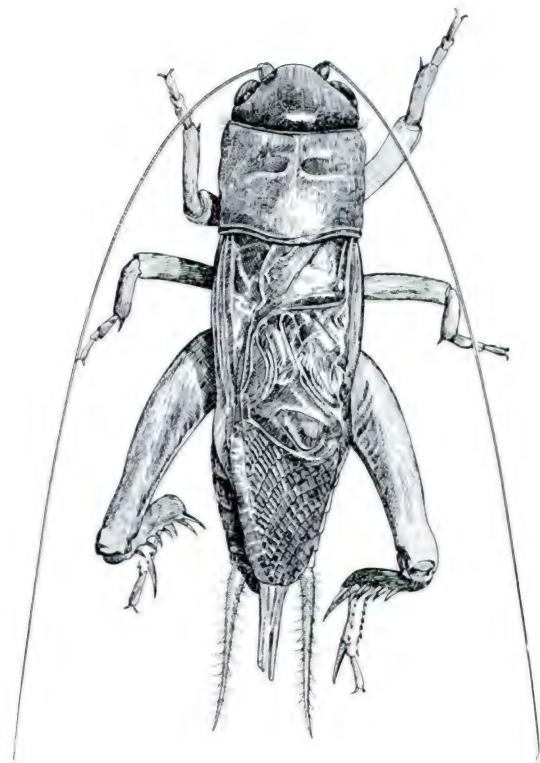
HABITAT. In burrows on mud banks, in colonies; males sing only at night.

SPECIMENS. A-177 3♂ 5♀ ANC, 1♂ 1♀ UM. A-178 5♂ ANC. A-767 3♂ 2♀ ANC, 1♂ 1♀ ANSP. Croker Island Mission, NT, 26 iii 1961, 1♂ ANC.

Gymnogryllus corroboree n. sp., Figs. 6, 9AC

RANGE. Northern NT and coastal QLD.

RECOGNITION. Males: Very similar to *G. brevicauda*. V-shaped gap at upper distal end of epiphallus much wider than in *G. brevicauda* (Fig. 9A). HW's not reaching end of abdomen. File with 79–91 teeth (n=6). Mirror complete, divided into at least 2 cells, sometimes with partial dividing vein entering from posterior vein; sometimes divided into 3 cells (Fig. 9C). Harp with 3 or 4 veins (smallest one sometimes incomplete). Body length 30–35 mm. Male from A-472 had 83 teeth, and one from A-26 had 85 teeth. Genitalia of these males similar to those of holotype. Holotype measurements: File with 91 teeth. Head 0.95 times as wide as widest part of pronotum. Greatest pronotal width 1.35 times median pronotal length. FW 3.23 times as long as pronotum and 1.22 times as long as femur

FIG. 6. *Gymnogryllus corroboree*.

III. Femur III 1.67 times as long as tibia III. Tibia III with 3–4 external and 4–5 internal subapical spurs. Body length ca. 32 mm; FW length 18 mm; femur III 15 mm; cerci 7.5 mm.

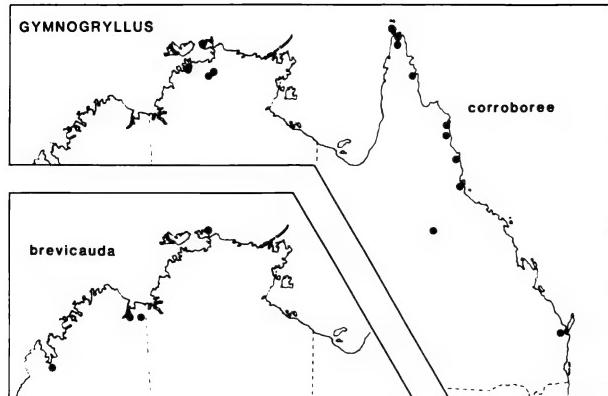
Females: Very similar to males in size and color. Ovipositor about 0.8 times as long as pronotum. FW's always extending to end of abdomen or beyond. HW's extending beyond end of abdomen and ends of FW's.

HOLOTYPE. ♂, A-304, 15.4 miles from Maryborough on road to Hervey Bay, QLD, 7 xi 1968, ANC.

SONG. Fig. 8. Loud piercing trill, more or less continuous, with high pulse rate, though not as high as *G. brevicauda*.

	p/s	kps	°C
A-301	78	5.5	24
*A-481	64	5.3	21.7

* Questionable record, no specimens caught.

FIG. 7. *Gymnogryllus* distributions.

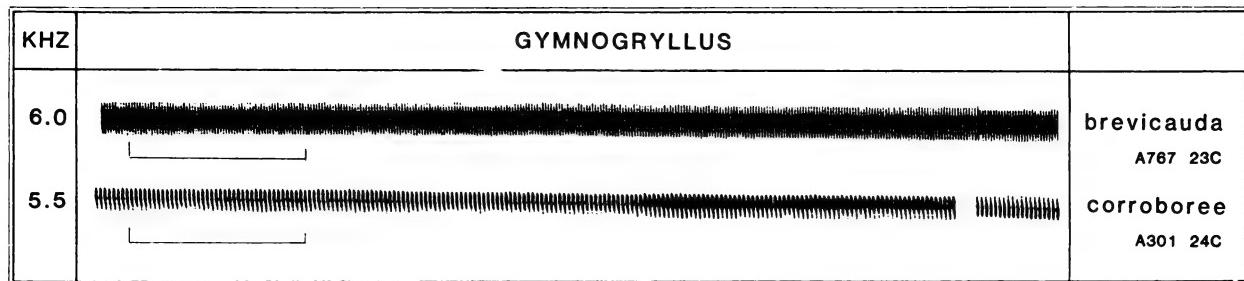
HABITAT. Males sing in colonies of a dozen or more, both in burrow entrances and apparently several inches from burrows; singing males sometimes only 1.5–2 feet apart in burrows. No females seen.

SPECIMENS. Holotype ♂ ANC. A-26 1♂ ANC, A-304 8♂ ANC, 3♂ UM, 1♂ ANSP. A-472 1♂ ANC. QUEENSLAND: Booby Island, 16 xii 1977, 1♂ ANC. Cooktown, 1♀ BM. Bamaga, Cape York, 6 vi 1969 (Monteith) 1♀ uqc. 22.12S 143.04E, 7 km N by E Rangelands, 1 x 1977 (Rentz, White) 1♀ ANC. Lockerbie Scrub, Cape York, 22 iv 1973 (Monteith) 1♀ uqc. Jardine River, Cape York, 12 vi 1969 (Monteith) 1♀ uqc. Iron Range, Cape York, 4 v 1973 (Monteith) 1♂ uqc. Gap Creek, 5 mi N Bloomfield River, 9 v 1970 (Monteith) 1♀ uqc. Ingham, 30 iii 1950 (Harley) 1♂ 2♀ uqc. NORTHERN TERRITORY: Darwin, 7 i 1964 (Sedlacek) 5♂ 1♀ BISH. Holmes Jungle, 11 km NE by E Darwin, 15 v 1973 (Upton et al.) 2♀ ANC. Jim Jim Ck, 19 km WSW Mt. Cahill, 19 v 1973 (Key et al.) 3♂ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE Mudginbarry HS, 25 v 1973 (Key) 1♂ 2♀ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen., 3 ii 1977 (Lewis) 4♂ 1♀ ANC. Same place, 24 i 1977 (Bakker) 1♂ ANC. Same place, 13 i 1977 (Farrow) 2♀ ANC. Same place, 17 ii 1977 (Weir) 1♀ ANC.

Genus ANUROGRYLLUS Saussure

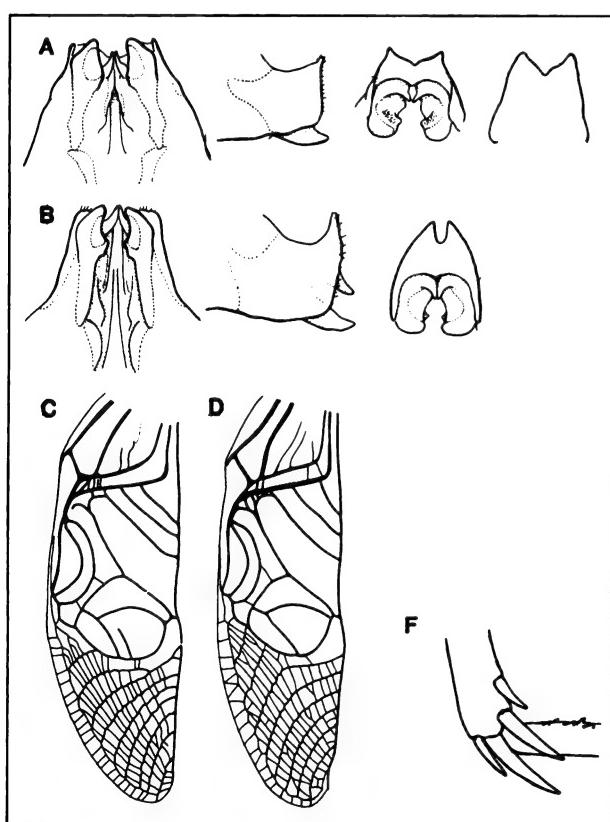
Anurogryllus Saussure 1877: 23. Type species: *Gryllus muticus* De Geer 1773: 520.

This genus is recorded only from eastern United States south to Brazil and from Tahiti and Australia. The Australian locality is based on a single male in the Paris Museum labelled "New Holland." This specimen does not differ from *A. muticus*, as known in the U.S. at least, in genitalia. The similarity of this cricket to American *Anurogryllus* raises doubts that it actually came from Australia. If it is Australian, we did not tape record or collect it.

FIG. 8. *Gymnogryllus* songs. Scale = 0.5 s.

Randell placed *Anurogryllus australis* Saussure in a new genus *Australogryllus*, on the basis of Australian specimens he saw. But, as Chopard (1967) indicates, Randell did not see Saussure's type, which is clearly congeneric with American *Anurogryllus*. Hence *Australogryllus* is not a valid genus, and Saussure's type of *A. australis* is of unknown

geographic origin. The specimen examined by Randell is a member of the genus *Cephalogryllus* Chopard. It is from Horn Island, North QLD, 2–10 April 1933 (Papuan–Aust. Expedition) and is deposited in the U.S. National Museum, and was determined by Randell himself.

FIG. 9. *Gymnogryllus*. A, *corroboree* (ventral, lateral, and posterior views); B, *brevicauda* (ventral, lateral, and posterior views); C, *corroboree* FW; D, *brevicauda* FW; F, *brevicauda* tibia III inner.

TRIBE CEPHALOGRYLLINI

We place three genera into this tribe: *Cephalogryllus*, *Stenocephalus*, and *Apterogryllus*. Although *Apterogryllus* lacks both sets of wings, the male genitalia resemble those of the first two genera closely, suggesting that the genus is a wingless, mute derivative of the *Cephalogryllus-Stenocephalus* stock. The resemblance between females of *Cephalogryllus* (entirely wingless) and *Apterogryllus* is very close, but they can be separated because the former possess auditory tympana while the latter do not. *Cephalogryllus* and *Stenocephalus* are confined to the northern and eastern forests of QLD and NSW (except for the problematical *C. mileurae* from WA). But *Apterogryllus* is widespread over the continent, from eastern forests to the dry interior and the seasonal northern savanna and woodlands.

Cephalogryllus

1. Tympana present, opening on outer face only.
2. FW present in males, 1.5–2.4 times as long as pronotum (but 2.9 in *mitanina* and 3.1 times in *mileurae*).
3. Mirror present or absent.
4. Mirror not divided (dividing vein present in *mitanina*).
5. Females without FW's.

Stenocephalus

1. Tympana present, opening on outer face only.
2. FW present in males, 2.5–3.8 times as long as pronotum.
3. Mirror always present.
4. Mirror always divided by one vein.
5. Females usually with short FW's.

Apterogryllus

1. Tympana absent in both sexes.
2. FW's absent in both sexes.
3. (FW's absent)
4. (FW's absent)
5. Females without FW's.

Genus CEPHALOGRYLLUS Chopard

Cephalogryllus Chopard 1925: 12. *Cephalogryllus laeviceps* Chopard, by monotypy.

In his 1951 monograph Chopard included three species in this genus: *C. laeviceps* Chopard which he described in 1925, *C. ruficeps* Chopard (1951), a species which we assign to the new genus *Rufocephalus*, and *C. australicus* Chopard (1951), which is assigned to the new genus *Stenocephalus*. The genus includes 14 species in Australia, all but one from the mountains and forests of eastern New South Wales and Queensland. *C. mileurae*, a species only tentatively assigned to this genus, is from western WA. The species seem to have highly restricted ranges, for most have been collected only at one place or along a short stretch of highway. We believe that the group is a large one and that we have perhaps gained only a glimpse of its diversity. Some of the species are true rainforest species and are common in leaf litter and along stream banks where they dig their burrows. Other species are found in drier eucalypt forests along the western slopes of the Dividing Range. All of the species may be burrowers with males singing at burrow entrances. In several species the compound eyes are reduced in size—perhaps in association with a more subterranean existence. Others have the hind tibia reduced in length, a characteristic often found in specialized burrowers.

RECOGNITION. The members of this group are related to the genus *Stenocephalus* and some species seem to be intermediate between the two. Indeed the distinction between the two groups may be rather artificial and it is possible that cephalogrylline characteristics may evolve whenever a stenocephaline assumes a burrowing habit.

Cephalogryllus possesses the following combination of characteristics which can be used to separate it from other gryllines. Auditory tympanum on outer face of tibia I only. FW's usually short, never reaching end of abdomen, often shorter than combined length of head and pronotum. Mirror present or absent; when present then without arch-

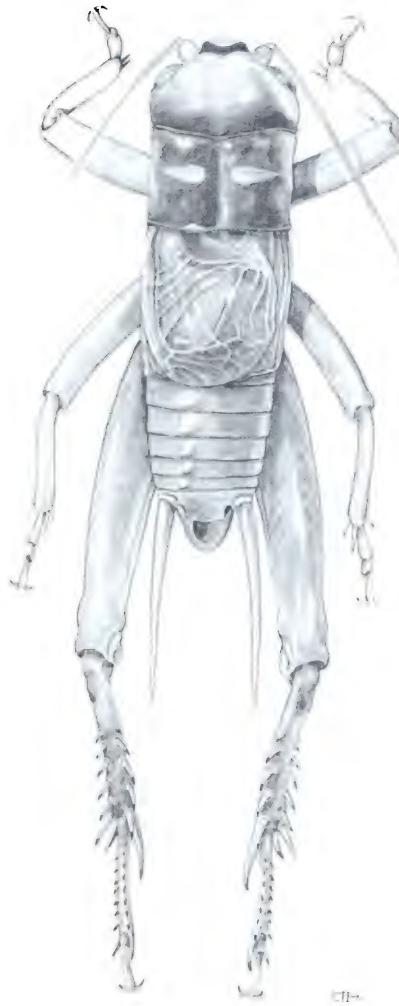
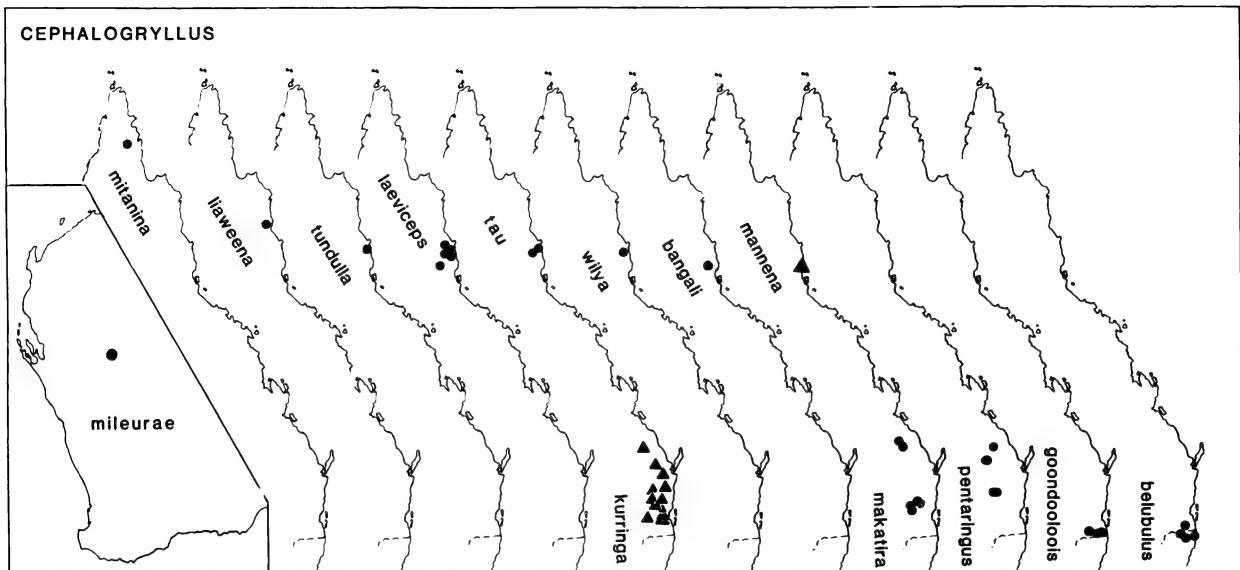


FIG. 10. *Cephalogryllus matakira*.

ing dividing vein. Lateral field of FW often dark. Body color usually rusty colored or dark reddish-brown. Head usually as wide or wider than pronotum (usually narrower in *Stenocephalus*). Pronotum usually with parallel sides or narrower in back than in front (wider in back in *Stenocephalus*). FW's in females very small, about $\frac{1}{3}$ the length of pronotum and not overlapping. Ovipositor also short, shorter than tibia III (longer in *Stenocephalus*).

KEY TO CEPHALOGRYLLUS MALES

1. Large species: body length more than 25 mm. Hind tibia strongly bent. Hind femur with spine on distal, inner face. FW without mirror *tau*
Not possessing above combination of characteristics ... 2

FIG. 11. *Cephalogryllus* distributions.

2. Mirror rather well developed and at least $\frac{1}{2}$ as wide as wing. Vein connecting mirror to Cu₁ short (Fig. 16CEGHL) 3
- Mirror poorly developed or small, less than $\frac{1}{2}$ as wide as the wing and with a long mirror to Cu₁ connecting vein (Fig. 16ABFJN) 7
3. Mirror as wide (longitudinal axis) or wider than region between mirror and posterior harp vein (Fig. 16ELM). Body length more than 18 mm. Harp with 7 or more veins 4
- Mirror narrower (long axis) than region between mirror and posterior harp vein. Body length less than 18 mm. Harp with 6 or less veins 6
4. Head large and globular. FW more than 2.8 times as long as pronotum. Tibia III less than 1.9 times as long as basitarsus III. Genitalia as in Fig. 13A mitanina
- FW less than 2.5 times as long as pronotum. Tibia III at least 2.0 times as long as basitarsus III. Genitalia not as in Fig. 13A 5
5. FW not more than 2.0 times as long as pronotum. Femur III more than 1.7 times as long as tibia III. Genitalia as in Fig. 14F belubulus
- FW more than 2.2 times as long as pronotum, femur III less than 1.5 times as long as tibia III. Genitalia as in Fig. 14E goondooloos
6. Harp with 5 veins. Genitalia as in Fig. 14BC bangali and mannena (see songs)
- Harp with 6 veins. Genitalia as in Fig. 14D kurringa
7. Pronotal disk mostly very dark and with two orange tear-shaped marks. FW without trace of mirror. FW length less than 1.6 times as long as pronotum. Genitalia as in Fig. 15B. File with ca. 90 teeth ... matakira
- Not fitting above description 8
8. FW less than 1.8 times as long as pronotum and less than 0.5 times as long as femur III. Hind femur less than 10 mm. Genitalia as in Fig. 15A liaweeena
- Not fitting above description 9
9. Femur III more than 2.0 times as long as tibia III. File with more than 140 and less than 180 teeth. Genitalia distinctive as in Fig. 13D laeviceps
- Not fitting above description 10
10. Harp with 6–8 veins. File with less than 60 veins. Genitalia as in Fig. 13B pentaringus
- Not fitting above description 11
11. Body length less than 11 mm. Harp with 2–3 veins. Head huge. Genitalia as in Fig. 15C. FW more than 3 times as long as pronotum. Western Australia mileurae
- Not fitting above description 12
12. FW less than 0.6 times as long as femur III. File with less than 85 teeth. Genitalia as in Fig. 14A tundulla
- FW more than 0.6 times as long as femur III. File with more than 95 teeth. Genitalia as in Fig. 13C wilya

Cephalogryllus laeviceps Chopard, Figs. 13D, 16B

Cephalogryllus laeviceps Chopard 1925: 12. Holotype ♂, Malandra, QLD (Mjöberg) sm. Type examined.

RANGE. Northern coastal QLD.

RECOGNITION. Males: Genitalia very distinctive (Fig. 13D). Mirror poorly developed. Harp with 4–5 veins. File with ca. 165 teeth. Head slightly wider than pronotum. Body color reddish; top of head and pronotum dark reddish-brown. Lower front corner of lateral lobes pale. Pronotum wider at front than back. FW 2.12 times as long as pronotum. FW not

TABLE 2. Comparison of *Cephalogryllus* species. Most measurements are of the holotype.

Species	No. file teeth	No. harp veins	FW length	FW length	Femur III length	Tibia III basitarsus	Body length (mm)	Femur III length (mm)	Mirror: + present
			pronot. length	femur III length	tibia III length	III			- absent
<i>laeviceps</i>	165	5	2.12	0.59	2.25		19	11	+ small
<i>liaweeena</i>	77	4	1.71	0.47	1.89	1.69	14	9.5	± ?
<i>wilya</i>	110	5	2.06	0.70	1.62	1.89	18	10	+ small
<i>tundulla</i>	75	4	2.07	0.50	1.71	2.00	17	9	+ small
<i>bangali</i>	40	5	2.33	0.68	1.63	1.88	16	9.5	+
<i>matakira</i>	78-98	4-5	1.52	0.42	1.83	1.84	20-24	15	-
<i>mitanina</i>	85-105	8-9	2.91	0.80	1.88	1.83	24	12	+
<i>pentaringus</i>	54	6-8	2.29	0.55	1.83	1.67	20	11	±
<i>goondooloois</i>	78-85	6-8	2.38	0.68	1.48	2.08	22	14	+
<i>belubulus</i>	55-69	6-7	1.92	0.56	1.80	2.00	24	16	+
<i>kurringa</i>	40-53	6	2.12	0.60	1.56		16	10	+
<i>tau</i>	60	5+	1.53	0.42	1.87	1.86	30	22	-
<i>mileurae</i>	67	2-3	3.12	0.90	1.40		11	5	+ very small

reaching middle of abdomen. Femur III 1.64 times as long as tibia III. Tibia III 2.25 times as long as basitarsus III. Tibia III usually with 5 outer subapical spurs. Body length ca. 19 mm; FW length ca. 6.5 mm; femur III ca. 11 mm; cerci ca. 8 mm.

Females: The only female, from A-27, is much larger than the males; body length ca. 26 mm; femur III length ca. 16 mm. FW's rounded, 0.83 times as long as pronotum and not overlapping medially. Ovipositor 1.3 times as long as pronotum. Tibia III with 5 inner and 5 outer subapical spurs.

SONG. Fig. 12. Slow trill with brief breaks at frequent intervals.

	p/s	kps	°C
A-489	18.0	5.2	22
A-62	9.2	4.3	16
A-27	8.5	4.7	24
A-27	12.4	5.9	24
A-27	12.4	4.9	24

HABITAT. In localized colonies a few yards across in yellow and red clay soils of dense rain forests; all three colonies located near streams. Males singing at burrow entrances or wandering under leaves; single adult female taken walking in leaf litter; juveniles inside burrows or walking about under leaves. Burrows usually 6-8 inches deep, often at juncture of tree roots, and usually leading directly under a root. Many dug out, probably by small mammal; perhaps roots reduce such predation.

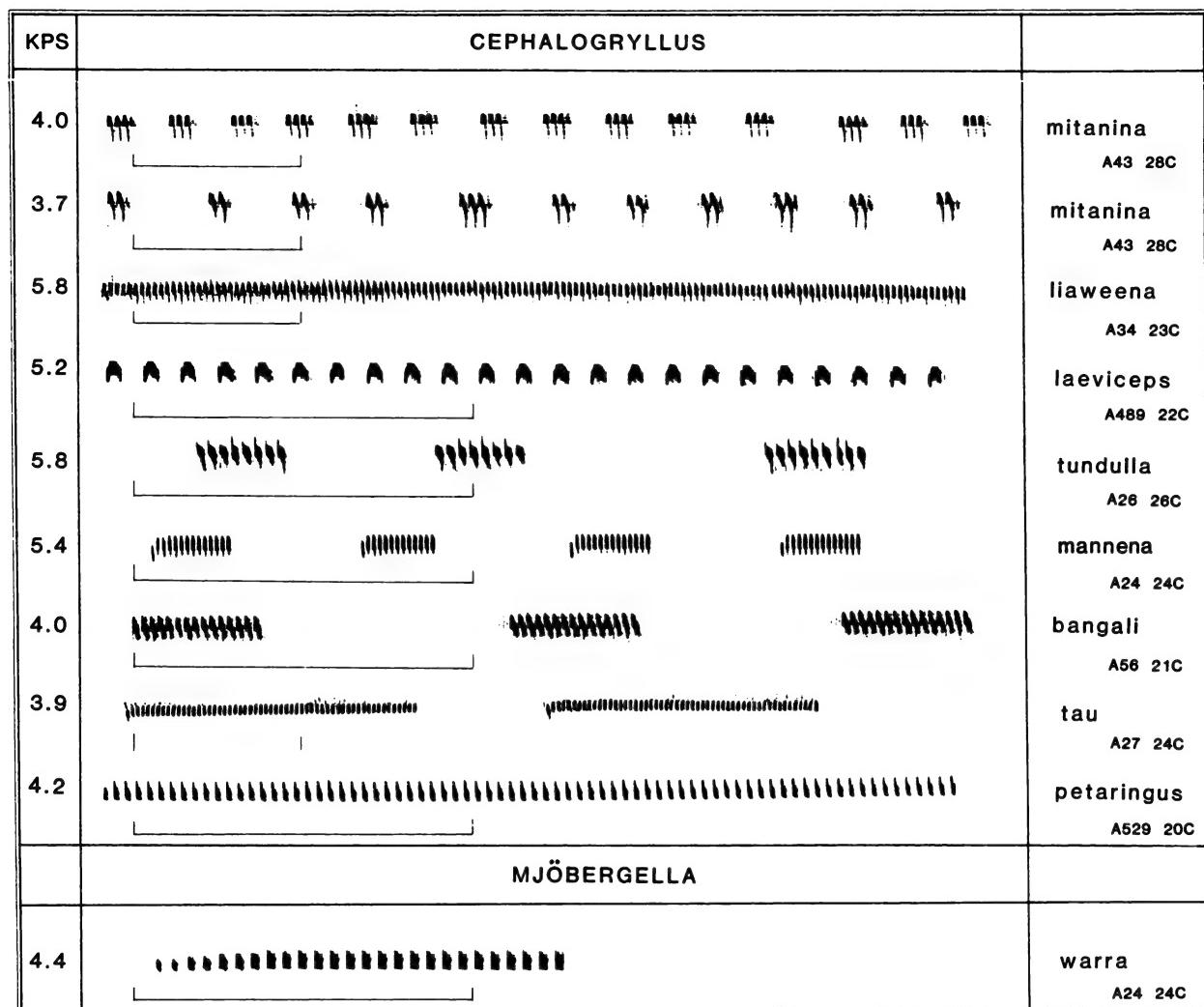
Adult males leap wildly when dug out of burrows; tiny juveniles, which sometimes wander in the leaf litter, also great leapers, unlike tiny juveniles of American *Anurogryllus* which mostly walk when disturbed. Several sizes of juveniles often together in same burrow.

SPECIMENS. Holotype ♂ SM. A-27 8♂ 1♀ ANC, 1♂ UM. A-62 1♂ ANC. A-286 1♂ ANC. A-488 1♂ ANSP. A-489 3♂ ANC. Tinaroo Range, 8 mi E Tinarrow Falls dam, QLD, 2♂ 2♀ ANC. Chopard also lists Mt. Tambourine and Herberton, QLD, SAM, but we did not critically examine these specimens. We believe it is unlikely that the Mt. Tambourine specimen belongs to this species.

Cephalogryllus liaweeena n. sp., Figs. 15A, 16J

RANGE. Type locality in northern coastal QLD.

RECOGNITION. Males: FW shorter than head plus pronotum. Mirror indistinct. Harp with 4 veins. Area between chord Cu₂ and diagonal vein divided into a number of cells. File with ca. 77 teeth. Epiphallus extremely elongated (Fig. 15A). Pronotum slightly wider in front than in back. Body color dark reddish-brown. Pronotum covered with fine hairs. Holotype measurements: Head 0.95 times as wide as front of pronotum. Front of pronotum 1.02 times as wide as back. FW 1.71 times as long as pronotum and 1.26 times greatest FW width. Femur III 1.89 times as long as tibia III. Tibia III with 4 external subapical spurs and 1.69 times length of basitarsus III. Body length 13.5 mm; FW length 4.5 mm. Femur III 9.5 mm; cerci ca. 7 mm.

FIG. 12. *Cephalogryllus* and *Mjöbergella* songs. Scale = 0.5 s.

HOLOTYPE. ♂, A-34, rain forest north of Daintree River, QLD, ix 1968, ANC.

SONG. Fig. 12. More or less continuous trill with moderately fast pulse rate.

	p/s	kps	°C
A-34	52	5.75	23

HABITAT. Males sing in colonies from burrow entrances or near burrows in rain forests.

SPECIMENS. Holotype ♂ ANC. A-34 1♂ ANSP.

Cephalogryllus wilya n. sp., Figs. 13C, 16D

RANGE. Type locality in northern coastal QLD.

RECOGNITION. Males: Very similar to *C. tundulla* and somewhat less similar to *C. bangalios*. Genitalia distinctive and file has 110 teeth. Longish Cu₁-mirror connecting vein as in *C. tundulla*. Harp with 5 veins. Head and pronotum very dark reddish-brown, head nearly black. Head 0.90 times as wide as pronotum. Pronotum with parallel sides. FW 2.06 times as long as pronotum and 1.32 times as long as wide. Femur III 1.62 times as long as tibia III. Tibia III 1.89 times as long as basitarsus III and

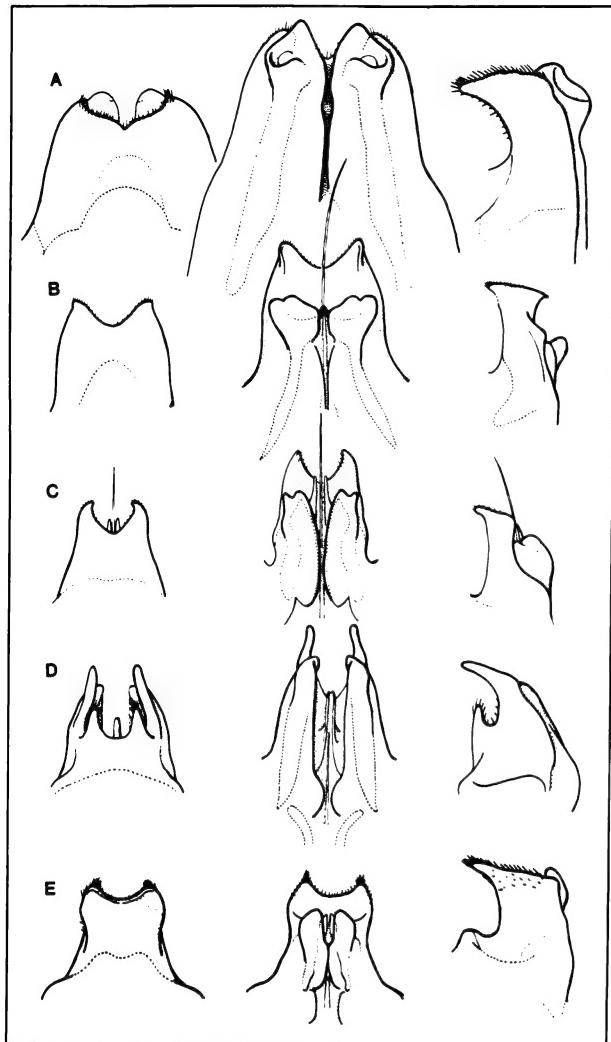


FIG. 13. *Cephalogryllus* male genitalia (dorsal, ventral, and lateral views). A, *mitanina*; B, *pentaringus*; C, *wilya*; D, *laeviceps*; E, *tau*.

with 5 external subapical spurs. Body length 18.5 mm; FW length 7 mm; femur III 10 mm; cerci ca. 6.5 mm.

HOLOTYPE. ♂, A-488 near The Craters, near Atherton, QLD, 17 ii 1969, ANC.

SONG. Trill, was only heard.

HABITAT. Leaf litter in rain forest.

SPECIMENS. Holotype ♂ ANC.

***Cephalogryllus tundulla* n. sp., Figs. 14A, 16G**

RANGE. Type locality in northern coastal QLD.

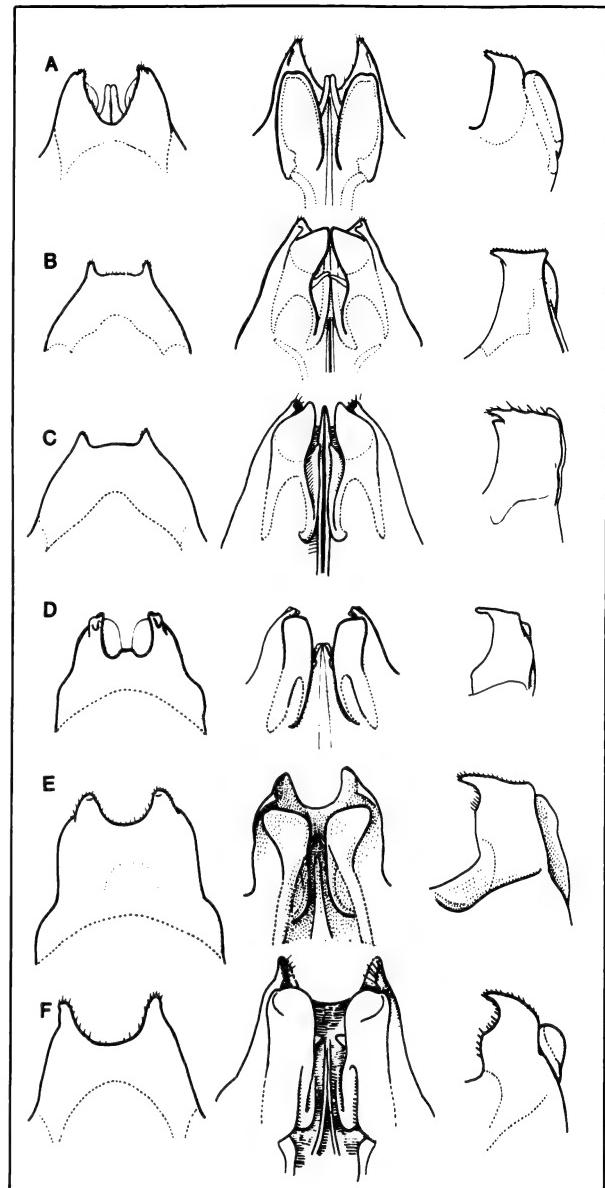


FIG. 14. *Cephalogryllus* male genitalia. A, *tundulla*; B, *mannena*; C, *bangali*; D, *kurringa*; E, *goondooloois*; F, *belubulus*.

RECOGNITION. Males: Similar to *C. bangalios* and *C. wilyarius*, but differing in genitalia. Also FW's shorter than head plus pronotum. Harp with 4 veins. Mirror small and connected to Cu₁ vein by long connecting vein. File has 75 teeth. Head and pronotum dark reddish-brown. Lower front corner of lateral lobes without pale area. Head 1.0 times as wide as front of pronotum. Front of pronotum

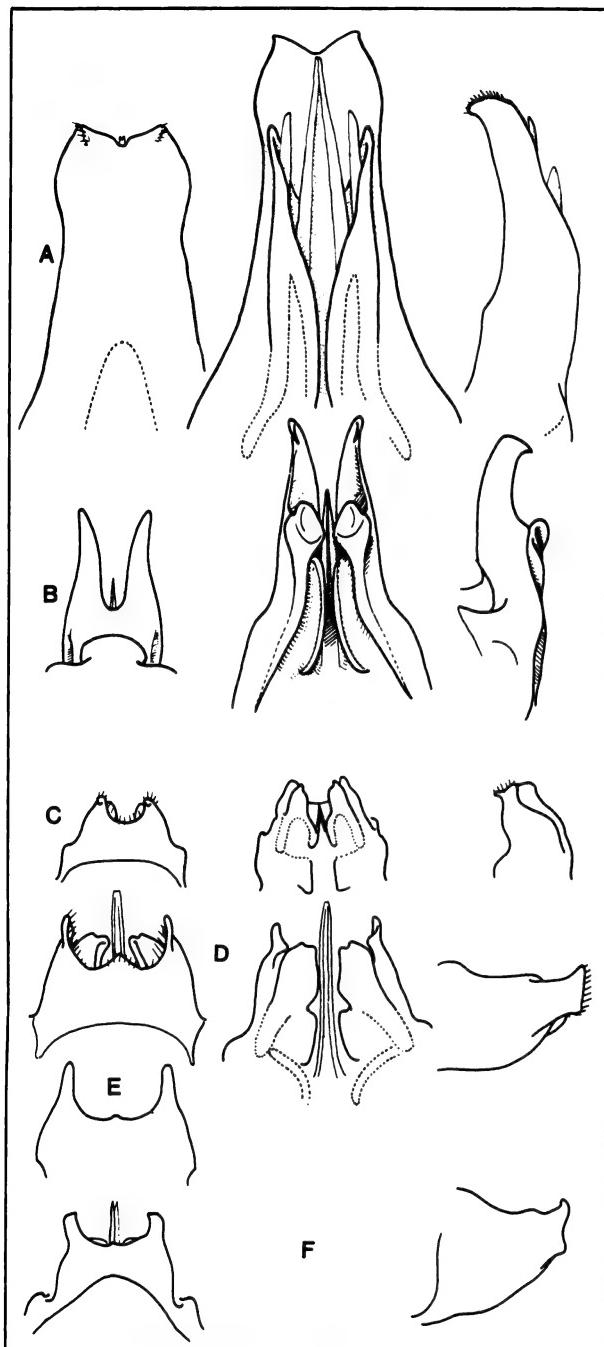


FIG. 15. *Cephalogryllus* male genitalia. A, *liaweeena*; B, *matakira*; C, *mileurae*; D, *kurringa* near Kenilworth QLD (Monteith 2A); E, *kurringa* Ravensbourne Nat. Pk (Monteith 38B); F, *kurringa* Bulburin Plateau (Monteith 33A).

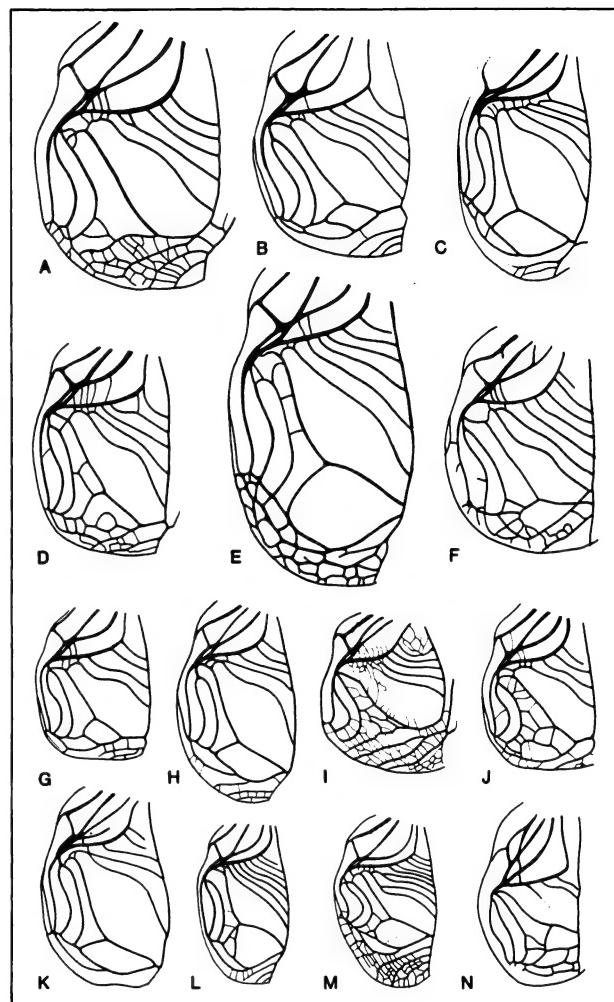
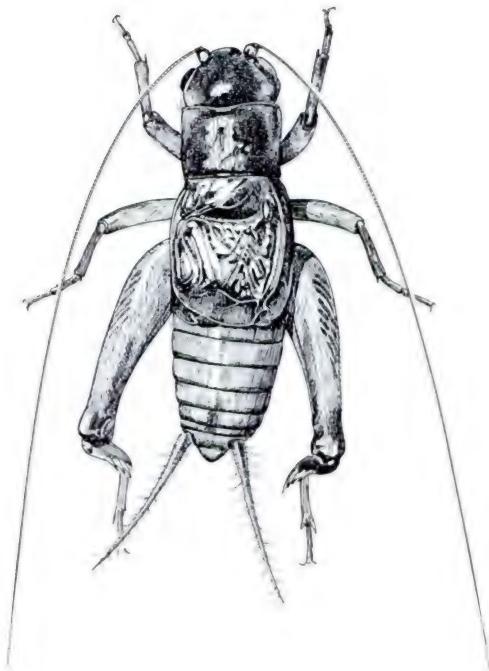
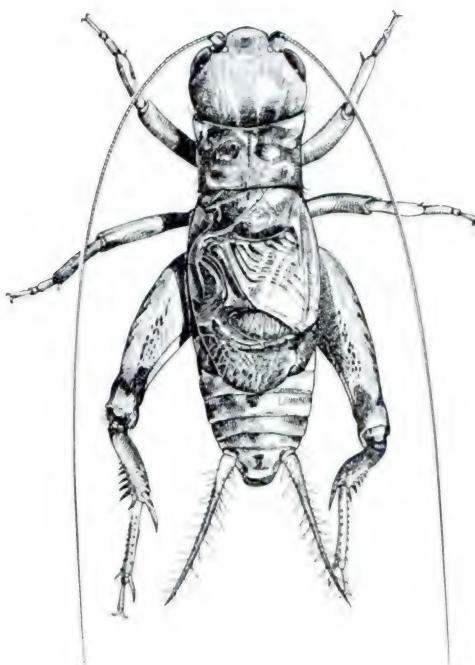


FIG. 16. *Cephalogryllus* right FW dorsal field. A, *matakira*; B, *laeviceps* A-286; C, *kurringa*; D, *wilya*; E, *belubulus*; F, *pentaringus*; G, *tundulla*; H, *mannena*; I, *tau*; J, *liaweeena*; K, *bangali*; L, *goondooloois*; M, *mitanina*; N, *mileurae*.

0.95 times as wide as back. FW 2.07 times as long as pronotum. FW length 1.32 times its greatest width. Femur III 1.71 times as long as tibia III. Tibia III with 5 external subapical spurs and 2.0 times as long as basitarsus III. Body length 17 mm; FW length 4.5 mm; femur III 9 mm; cerci 7 mm.

HOLOTYPE. ♂, A-26, forest along Bramston Beach Road from Innisfail, QLD, 18 ii 1969, ANC.

SONG. Fig. 12. Succession of 8- to 9-pulse chirps with moderately fast pulse rate.

FIG. 17. *Cephalogryllus bangali*.FIG. 18. *Cephalogryllus mitanina*.

	p/s	p/ch	ch/s	kps	°C
A-26	58	8-9	2.4	5.8	26

HABITAT. About ten males singing from burrows in leaf litter on steep hillside in eucalyptus forest.

SPECIMENS. Holotype ♂ ANC.

Cephalogryllus bangali n. sp., Figs. 14C, 16K

RANGE. Type locality in northern coastal QLD.

RECOGNITION. Males: Most similar to *C. mannena*, but pulse rate of song different, and FW's and genitalia slightly different. File with 44 (holotype) and 44 teeth. Harp with 5 veins. FW's as long or longer than head plus pronotum. Body color dark reddish-brown, shiny. Holotype measurements: Head 0.95 times as wide as front of pronotum. Front of pronotum 0.90 times as wide as back. FW 2.33 times as long as pronotum. Femur III 1.63 times as long as tibia III. Tibia III 1.88 times as long as basitarsus III. FW as in Fig. 16K. Genitalia as in Fig. 14C. Tibia III with 5 subapical spurs. Body

length 16 mm; FW length 6.5 mm; femur III 9.5 mm; cerci ca. 7 mm.

HOLOTYPE. ♂, A-56, Mount Tyson, behind Tully, QLD, 1 ix 1968, ANC.

SONG. Fig. 12. Succession of 15- to 16-pulse chirps with very fast pulse rate. Chirp series began with four individual pulses delivered about 6/s (these not taped).

	p/s	p/ch	ch/s	kps	°C
A-56	75-78	15-16	3.45	3.95	22

HABITAT. Numerous males heard singing in leaf litter along path leading to summit of Mount Tyson.

SPECIMENS. Holotype ♂ ANC. A-56 4♂ ANC.

Cephalogryllus mannena n. sp., Figs. 14B, 16H

RANGE. Type locality in coastal forests of north-east QLD.

RECOGNITION. Males: Very similar to *C. bangali* but differing slightly in the genitalia and FW venation. File with 44 (holotype) and 35 teeth (n=2).

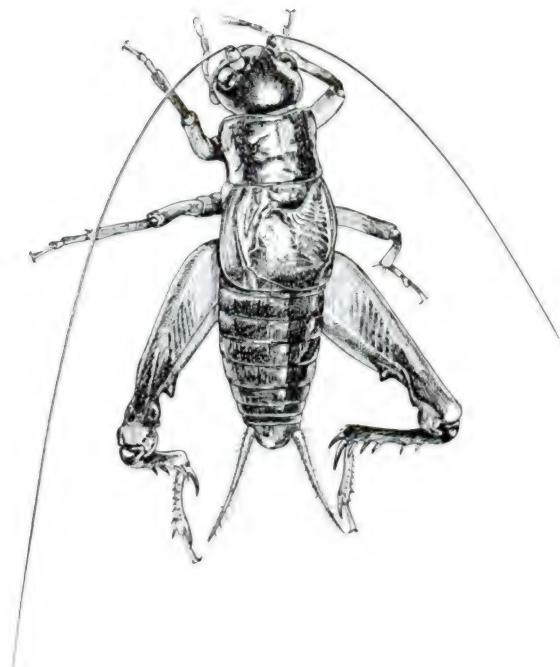


FIG. 19. *Cephalogryllus tau*.

Holotype measurements: FW 2.15 times as long as pronotum; femur III 3.15 times as long as pronotum. Body length ca. 14.5 mm; femur III length ca. 8.5 mm.

HOLOTYPE. ♂, A-24. Rain forest along Mission Beach Road, near Tully, QLD, 19 ii 1969, ANC.

SONG. Fig. 12. Similar to *C. bangali*, but with much faster pulse rate and higher pitched.

	p/s	p/ch	ch/s	kps	°C
A-24	114	14	3.2	5.4	24

HABITAT. Lowland rain forest.

SPECIMENS. Holotype ♂ ANC. A-24 1♂ ANC.

Cephalogryllus matakira n. sp., Figs. 15B, 16A

RANGE. Southeastern QLD.

RECOGNITION. Males: Body very shiny. Top front of head orange-brown and with black ring surrounding median ocellus. Genitalia as in Fig. 15B. FW without mirror. Harp with 4–5 veins. File with 78–98 teeth ($n=3$). Both males have left FW on top. Pronotal disk very dark except for two symmetrical orange tear-shaped marks in center. Head slightly

wider than pronotum. Pronotum slightly wider in front than in back (in a paratype male sides are parallel). Lower front corner of lateral lobes with pale area. Eyes small as in *C. belubulus*. Holotype measurements: FW 1.52 times as long as pronotum and 1.09 times as long as wide. Femur III 1.83 times as long as tibia III. Tibia III with 5–6 external and 5 internal subapical spurs and 1.84 times as long as basitarsus III. Body length 23.5 mm (20 mm paratype); FW length 6.3 (6) mm; femur III 15 mm; cerci ca. 7 mm. File with 90 teeth.

Females: Ovipositor variable in length: Female presumed to belong to this species (collected with male in the same pitfall trap) has ovipositor about 1.2 times as long as femur III. Female from Bulburin Plateau, via Miriamvale, QLD, has ovipositor 0.48 times as long as hind femur. Body length 22–26 mm; femur III length 14–16 mm.

HOLOTYPE. ♂, Forest Station, 2000 feet, Bulburin State Forest, via Many Peaks, QLD, 2–5 iv 1972 (G. B. Monteith) uQC.

SONG. Not known.

SPECIMENS. Holotype ♂ uQC. Same data as holotype, 1♂ uQC. Rainforest Pitfall 11, Gallangowan, SE QLD, 1974–1975, 487 m (Monteith) 1♂ 1♀ 1j QM. Rainforest Pitfall 12, Bouloumba Creek, via Conondale, SE QLD, 1974–1975 518 m (Monteith) 1♂ QM. Rainforest Pitfall 15, Base of Blackbutt Range, via Benarkin, SE QLD, 1974–1975, 244 m (Monteith) 1♀ QM. Rainforest Pitfall 28, Tungi Creek, via Jimna, SE QLD, 1974–1975, 550 m (Monteith) 1♀ QM. Rainforest Pitfall 33, Bulburin Plateau, via Miriamvale, SE QLD, 1974–1975, 609 m (Monteith) 1♀ QM.

Cephalogryllus mitanina n. sp., Figs. 13A, 16M

RANGE. Type locality in north-central Cape York Peninsula.

RECOGNITION. Males: Pale with large yellow-brown to orange-brown head. Head wider than pronotum. Pronotum widening back to front. Pronotum with pale lateral lobes and with large dark patches on the disk. FW with mirror. Mirror sometimes once divided. Harp with 8–9 veins. Genitalia as in Fig. 13A. File of holotype has 95 teeth. Hind tibia relatively short. One male exceptionally large with huge head (see Fig. 18). General coloration of head and pronotum yellowish-red, of appendages, abdomen, and tegmina pale brownish to yellowish; hind femora faintly marked with diagonally arranged splotches; head noticeably large and globular. Five paratype males have the following number of file teeth: 89, 98, 99, 99, and 103. Holotype mea-

surements: Head 1.05 times as wide as front of pronotum. Front of pronotum 1.10 times as wide as back. FW 2.91 times as long as pronotum. Femur III 1.88 times as long as tibia III. Tibia III with 4 internal and 4 external subapical spurs and 1.83 times as long as basitarsus III. Body length 24 mm; FW length 9.5 mm; femur III 12 mm; cerci 7.5 mm.

Females: Similar to males in color and size, also having a large globular head which is wider than the pronotum. FW's very short, about 0.3 times length of the pronotum. Ovipositor 1.33 times as long as pronotum.

HOLOTYPE. ♂, A-43, 61 miles north of Coen on road to Iron Range, Cape York Peninsula, QLD, 12 viii 1968, ANC.

SONG. Fig. 12. Succession of 3-pulse chirps.

	p/s	p/ch	ch/s	kps	°C
A-43	40	2-3	3.8-5.4	3.7-4.0	28

HABITAT. In burrows in colonies in dry soil along gullies.

SPECIMENS. Holotype ♂ ANC. A-43 3♂ 2♀ ANC, 1♂ UM, 1♂ ANSP.

Cephalogryllus pentaringus n. sp., Figs. 13B, 16F

RANGE. Mountains of southeastern QLD.

RECOGNITION. Males: FW slightly longer than head plus pronotum but not reaching middle of abdomen. Genitalia as in Fig. 13B. Eyes small as in *C. belubulus*. Lower front corner of lateral lobes with pale area. File with ca. 54 teeth. Harp with 6-8 veins. Tibia III exceptionally short. Head slightly wider than pronotum. Pronotum with slightly concave margins (top view). Holotype measurements: FW 2.29 times as long as pronotum and 1.28 times as long as wide. Femur III 1.83 times as long as tibia III. Tibia III with 5 inner subapical spurs and 1.67 times as long as basitarsus III. Body length 21 mm (but abdomen expanded). FW length 6 mm; femur III 11 mm; cerci ca. 6 mm.

HOLOTYPE. ♂, A-520, 40 miles south of Monto on Burnett Highway, QLD, 22 ii 1969, ANC.

SONG. Fig. 12. Continuous loud trill with high pulse rate.

	p/s	kps	°C
A-518	80	3.9	24
A-529	56-65	3.6-5.1	20

HABITAT. Colonies of numerous singing males were found at each locality, in light, dry clay soil in open eucalyptus forests with heavy continuous leaf litter. Light rain had just fallen. Most burrow openings were beneath leaves, and three burrows dug out were about a foot deep; two had seeds near the lower end. No females or juveniles were seen. Males sang facing out of the burrow, with about half the length of the antennae outside.

SPECIMENS. Holotype ♂ ANC. A-520 3♂ ANC, 3♂ UM. A-530 2♂ ANC, 2♂ ANSP.

Cephalogryllus goondooloois n. sp., Figs. 14E, 16L

RANGE. Extreme southeastern QLD.

RECOGNITION. Males: Similar to *C. belubulus* but differing in the genitalia (Fig. 14E). Eyes small as in *C. belubulus*. Head wider than pronotum. Pronotum wider in front than back. Harp with 7 veins. Mirror well-developed. Head reddish-brown. Legs yellowish. File with 78-85 teeth (n=3). Holotype measurements: Head 1.03 times as wide as front of pronotum. Front of pronotum 1.11 times as wide as back. FW 2.38 times as long as pronotum and 1.56 times the greatest width. Femur III 1.48 times as long as tibia III. Tibia III with 5 external and 5 internal subapical spurs and 2.08 times as long as basitarsus III. Body length 22 mm; FW length 9.5 mm; femur III 14 mm; cerci (broken) more than 6 mm.

HOLOTYPE. ♂, Lamington National Park, QLD, 2 vi 1960 (J. Thompson) UQC.

SONG. Not known.

HABITAT. Forest floor.

SPECIMENS. Holotype ♂ UQC. Rainforest Pitfall 35, Repeater Station, Springbrook, SE QLD, 1974-1975, 1000 m (Monteith) 1♂ QM. Rainforest Pitfall 63, Border Fence, Lever's Flat, via Rathdowney, QLD, 1975-1976, 670 m (Monteith) 2♂ QM.

Cephalogryllus belubulus n. sp., Figs. 14F, 16E

RANGE. Extreme eastern NSW-QLD border.

RECOGNITION. Males: Large rusty-colored cricket. Very similar to *C. goondooloois*. One of the largest members of the genus: body length 24 mm. Mirror well-developed but undivided. Harp with 6-7 veins. FW about as long as head plus pronotum. Genitalia as in Fig. 14F. File with 55-69 teeth (n=5). Eyes exceptionally small. Head and pronotum uniformly dark reddish-brown. Legs rusty-red. Head about as wide as pronotum. Front of prono-

tum slightly wider than back. FW 1.92 times as long as pronotum and 1.43 times as long as greatest width. Femur III 1.80 times as long as tibia III. Tibia III 2.0 times as long as basitarsus III. Tibia III with 5 internal and 5 external subapical spurs. Body length 24 mm; FW length 9 mm; femur III 16 mm; cerci ca. 11 mm.

Females: Ovipositor very short, about one third length of pronotum. Body length 19–22 mm; femur III length 13–14 mm; cerci 9–10 mm.

HOLOTYPE. ♂, A-545, 1.7 miles south of Queensland border, near Woodenbong, NSW, 24 ii 1969, ANC.

SONG. Taped poorly and briefly once at 18°C, trill about one second long, rate estimated (roughly) at 35–40 p/s. Trills separated by minute or so.

HABITAT. Two males heard, one collected by raking leaf litter in rocky, dry wash on steep slope in moist forest. Very difficult to trace by song or tape-record because one-second trills usually separated by intervals of minute or so.

SPECIMENS. Holotype ♂ ANC. Rainforest Pitfall 36, Natural Arch, Numinbah Valley, SE QLD, 1974–1975, 305 m (Monteith) 1♂ QM. Rainforest Pitfall 40, Rotary Park, Lismore, NSW, 1974–1975, 85 m (Monteith) 4♂ 3♀ QM. Rainforest Pitfall 41, Victoria Park, via Alstonville, NSW, 1974–1975, 213 m (Monteith) 1♂ QM. Rainforest Pitfall 66, Broken Head, NSW, 1975–1976, 30 m (Monteith) 1♂ QM.

Cephalogryllus kurringa n. sp., Figs. 14D, 15DEF, 16C

RANGE. Mountain forests of southeastern QLD.

RECOGNITION. Males: FW's longer than head plus pronotum and extending beyond middle of abdomen. Harp with 6 veins (smallest indistinct). Epiphallus with small median process. Head about as wide as pronotum. Pronotum with parallel sides (top view). Head, thorax, and wings dark reddish-brown. Legs reddish. File with 40–53 teeth (n=20). Holotype measurements: FW 2.12 times as long as pronotum and 1.57 times as long as wide. Femur III 1.56 times as long as tibia III. Tibia III with 4 and 5 external and 4 internal subapical spurs. Body length ca. 16 mm (abdomen is shrunken); FW length 6 mm; femur III 10 mm; cerci broken.

Females: Ovipositor very short, about one third to one half the length of the pronotum. Body length 16–18 mm; femur III length 10.0–11.5 mm; cerci 6–7 mm.

HOLOTYPE. ♂, Highvale, QLD, 20 iv 1962 (J. Teitzel) UQC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ UQC. Rainforest Pitfall 2, Little Yabba Creek, via Kenilworth, SE QLD, 1974–1975, 152 m (Monteith) 10♂ 2♀ QM. Rainforest Pitfall 5, Dingo Creek, via Traveston, SE QLD, 1974–1975, 30 m (Monteith) 9♂ QM. Rainforest Pitfall, Cooran Plateau, via Traveston, SE QLD, 1974–1975, 366 m (Monteith) 1♂ 1♀ 8j QM. Rainforest Pitfall 10, Wrattens Camp SF, via Widgee, SE QLD, 1974–1975, 700 m (Monteith) 1♂ QM. Rainforest Pitfall 12, Bouloumba Creek, via Conondale, SE QLD, 1974–1975, 518 m (Monteith) 4♂ 1♀ QM. Rainforest Pitfall 15, Base of Blackbutt Range, via Benarkin, SE QLD, 1974–1975, 244 mm (Monteith) 1♂ 1♀ 5j AM. Rainforest Pitfall 28, Tungi Creek, via Jimna, SE QLD, 1974–1975, 550 m (Monteith) 1♂ 3j QM. Rainforest Pitfall 33, Bulburin Plateau, via Miriamvale, SE QLD, 1974–1975, 609 m (Monteith) 3♂ QM. Rainforest Pitfall 38, Ravensbourne Nat. Park, via Toowoomba, SE QLD, 1974–1975, 731 m (Monteith) 3♂ QM. Rainforest Pitfall 51, Brookfield, SE QLD, 1975–1976, 110 m (Monteith) 6♂ 1♀ QM. Rainforest Pitfall 69, Mt. Bauple, via Maryborough, SE QLD, 1976–1977, 275 m (Monteith) 1♂ QM. Rainforest Pitfall 70, Mt. Goonaneman, via Childers, SE QLD, 1976–1977, 670 m (Monteith) 4♂ 2j QM. Rainforest Pitfall 77, Elginvale, 30 km NE Nanango, QLD, 1976–1977, 610 m (Monteith) 1♂ 1♀ QM.

Cephalogryllus tau n. sp., Figs. 13E, 16I

RANGE. Forests of northern coastal QLD.

RECOGNITION. Males: Largest member of genus—body length ca. 30 mm. Tibia III with strong inward bend in middle section. Femur III with large, low spine along inner lower face in distal third. FW's strongly sclerotized. Harp with at least 5 veins. Mirror absent. Region between chord Cu₂ and diagonal vein subdivided into many cells. File with 60 teeth (holotype). Genitalia as in Fig. 13E. In addition to above features this species is very dark reddish-brown, almost black on top of head and thorax. Holotype measurements: Head 0.95 times as wide as front of pronotum. Pronotum with roughly parallel sides (top view). FW 1.53 times as long as pronotum and 1.18 times as long as wide. Femur III 1.87 times as long as tibia III. Tibia III 1.86 times as long as basitarsus III. Body length 30 mm; FW length 9.5 mm; femur III 22.5 mm; cerci ca. 8 mm (tips broken).

Females: Like males except posterior tibiae less noticeably bent. FW's small half moon pads, 0.36 times as long as pronotum. Ovipositor 0.92 times as long as femur III.

HOLOTYPE. ♂, A-27, The Boulders Park, near Babinda, north QLD, 2 ix 1968, ANC.

SONG. Males sing at night, in our experience inevitably from inside burrow entrances ($n > 20$). Very loud and piercing to human ear, short trills of somewhat erratic length, produced at slightly less than one per second in cases observed by us. Trills about one second long, intervals between them about one-fourth as long as trills. Some shorter, more erratic trills taped by us are probably courtship signals (Fig. 12).

	p/s	tr/s	kps	°C
A-27	64.5	0.77-0.83	3.6-4.0	24

GENERAL BIOLOGY. This large burrowing cricket lives in colonies in rain forest, spending most of its time underground during both juvenile and adult stages. The juveniles are round-bodied, plump insects that emerge and forage nocturnally. Burrows of adult males seem to be open day and night, and like those of juveniles, are approximately 6–8 inches deep with an enlarged chamber near the lower end. Like other *Cephalogryllus*, these crickets cut and carry leaves, seeds, and other plant materials into their burrows. A juvenile with a burrow entrance a few inches from one of our oatmeal trails carried pieces of dry oatmeal back to his burrow. Burrows of juveniles and females are generally closed with a mound of excavated pellets over the entrance, and those of adult females seem a little deeper than those of juveniles and males. Tiny juveniles are usually found in burrows with adult females, and are sometimes seen at night on the soil surface near a burrow entrance. More than a single intermediate-sized juvenile is sometimes found in a single burrow.

The diameter of a burrow indicates the size of the occupant; those of adults are about $\frac{3}{4}$ inch across. Many burrows open at the V formed by surface roots of trees, and others run beneath large, horizontal, partly buried roots that only become apparent when one tries to excavate for the cricket. Crickets with their burrows in more open areas are frequently dug out by a nocturnal predator that we supposed by the nature of its work to be a small mammal, probably a bandicoot. Once a colony of these crickets is located, it is not particularly diffi-

cult, with a large shovel, to extricate individuals either day or night.

LIFE CYCLE. On our first visit to The Boulders, 3 August, we collected juveniles but heard and saw no adults. On 21 August a few males were singing and late juveniles were abundant. On 2 September singing males were abundant, and adult females, small and large juveniles were taken; on 28 October we took an adult male and female near Bramston Beach, where none had been heard on 2 August. On 17 February there were no singers at The Boulders and only juveniles were found. These data suggest that the species is univoltine, that the adult season is remarkably short for a lowland tropical rainforest species (ca. 2 months), and that juvenile development is maximal during the rainy season.

SPECIMENS. Holotype ♂ ANC. A-26 1♂ ANSP. A-27 1♂ 2♀ ANC, 2♂ UM.

***Cephalogryllus mileurae* n. sp., Figs. 15C, 16N**

TAXONOMY. This species is tentatively placed in the genus *Cephalogryllus*. But because it is so distantly separated geographically from the other members of the genus, this assignment is questionable.

RANGE. Type locality at Mileura Station in western WA.

RECOGNITION. Males: Very small—body length ca. 10.5 mm. Body color brownish. Head very large—height of head 2.11 times height of pronotum (lateral view); length of head 1.50 times length of pronotum (top view). Eyes relatively small, position low on head (side view) such that distance from top of head to top of eye about equal to height of eye. Dorsum of head with 4–6 longitudinal narrow, pale stripes. Harp with only 2 veins. Venation as in Fig. 16N. File of holotype with 67 teeth. Femur III with 4 inner and 4 outer subapical spurs. Holotype measurements: FW 3.12 times as long as pronotum. Femur III 1.40 times as long as tibia III and 1.11 times as long as FW. Pronotal width 1.82 times the length.

HOLOTYPE. ♂, Mileura Station, WA, 1 x 1974 (W. Bailey) ANC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♂ ANC.

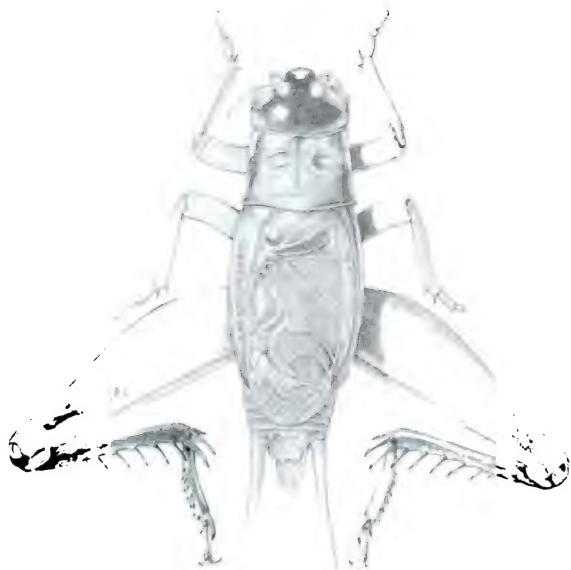


FIG. 20. *Stenocephalus aperensis*.

STENOCEPHALUS n. gen.

TYPE SPECIES. *Cephalogryllus australicus* Chopard.

We describe this genus to include the above species and 12 previously undescribed species, all from northeastern Queensland, one from New Guinea, and two from the Solomon Islands. The name refers to the fact that the head, particularly in the males, is narrow in relation to the body, and the pronotum widens posteriorly. The genus is related to *Cephalogryllus* and may be related to *Itaropsis* Chopard (1925: 510) a genus with two species, one from India and Ceylon and another from Ethiopia (Chopard 1967: 116). It also resembles somewhat the monotypic genus *Gryllitara* Chopard (1931: 138) which Chopard places in the tribe Itarini, subfamily Eneopterinae. *Gryllitara* possesses a series of spines above the spurs on tibia III and tympanal openings on both inner and outer faces of tibia I; the tibial characters suggest an affinity to *Landreva* (Landrevini) rather than to the Itarini.

RECOGNITION. This genus possesses the follow-

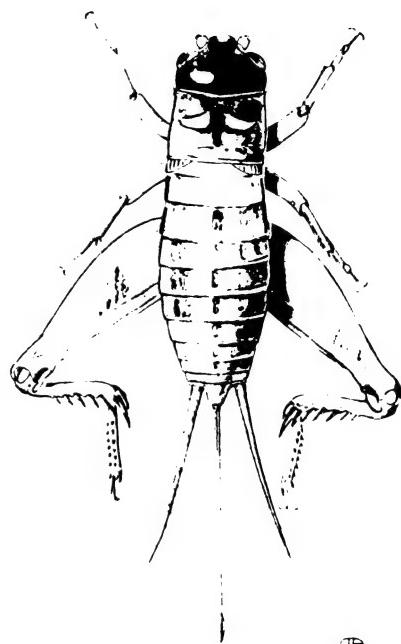
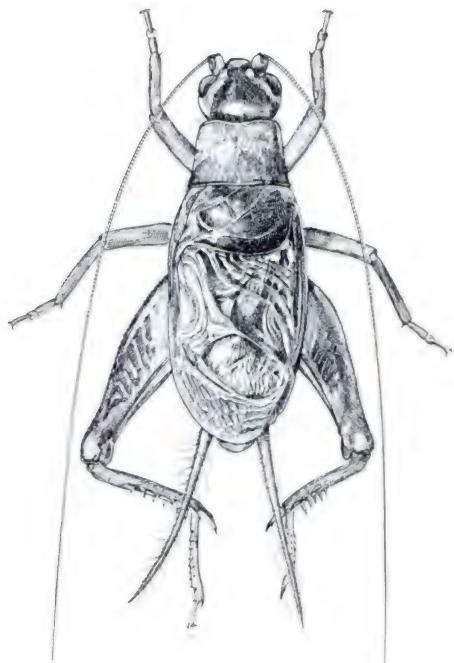


FIG. 21. *Stenocephalus patawilyis* female.

ing combination of characteristics: Head usually narrower than pronotum (especially striking in longer winged species) and pronotum usually widening posteriorly. Mirror well developed and divided once. Harp with at least 5 veins (shared with *Cephalogryllus*). Tympanal openings located only on the outer face of tibia I. Body color brown. FW's of males variable in length; but almost always extending beyond middle of abdomen (usually much shorter in *Cephalogryllus*). FW's of females tiny, non-overlapping pads that are scarcely noticeable (Fig. 21). Ovipositor in the few existing females is much longer than the head plus pronotum.

The genus also occurs in New Guinea and the Solomon Islands. We have one male from Dutch New Guinea. Two males of this genus from the Solomon Islands in the Paris museum were examined by Chopard. He added labels bearing the words "Itaragryllus multivenosus" (unpublished name). The specimens must have been examined after 1966, the year in which they were collected. Examination of the genitalia indicates that the two males belong to different species. Members of this genus from outside of Australia will be described in a forthcoming paper.

FIG. 22. *Stenocephalus bookandrini*.

The songs of *Stenocephalus* males are all fairly loud, and singing individuals "spraddle" their hind legs during stridulation so as to form a well-fitted extension of the "band-shell" made by the body and the lifted tegmina. We do not know where these crickets spend the day, but we have not seen them

retreat into burrows. We have taken them from leaf trash, on standing trees up to several feet above the ground, at the base of fan palms, among stones and grass on steep, eroded banks, and in rain forests. They are wary and quick and extraordinary leapers. One male travelled nearly nine feet in a single leap from a perch one foot up on a tree trunk when a head lamp was turned on him from several yards away.

Australicus Group

1. Male epiphallus relatively short and broad (Fig. 25) (*wookatios* intermediate).

2. FW more than 0.7 times as long as femur III.

Patawilyis Group

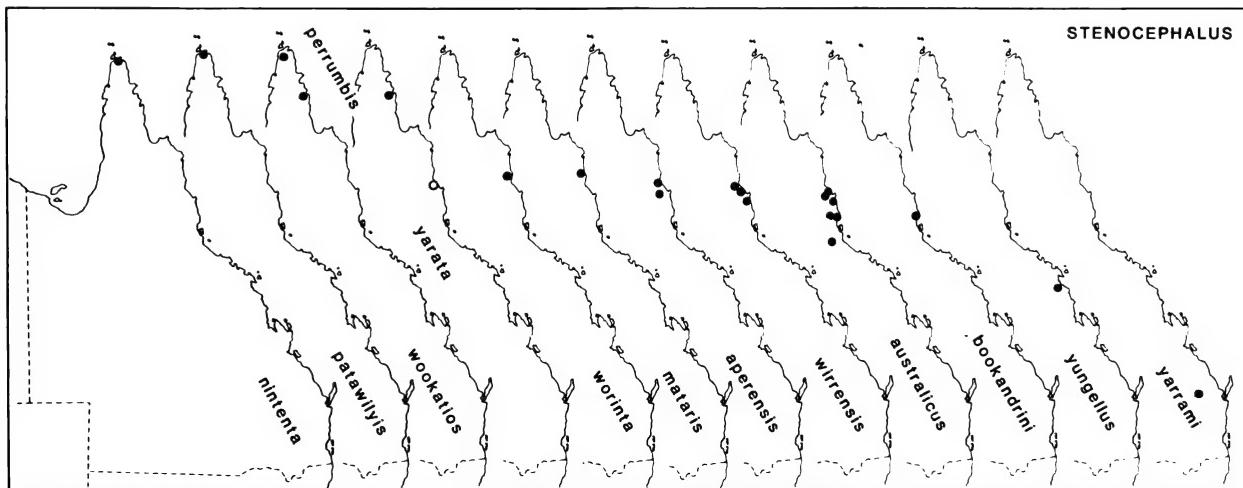
1. Male epiphallus longer and narrower (Fig. 26).

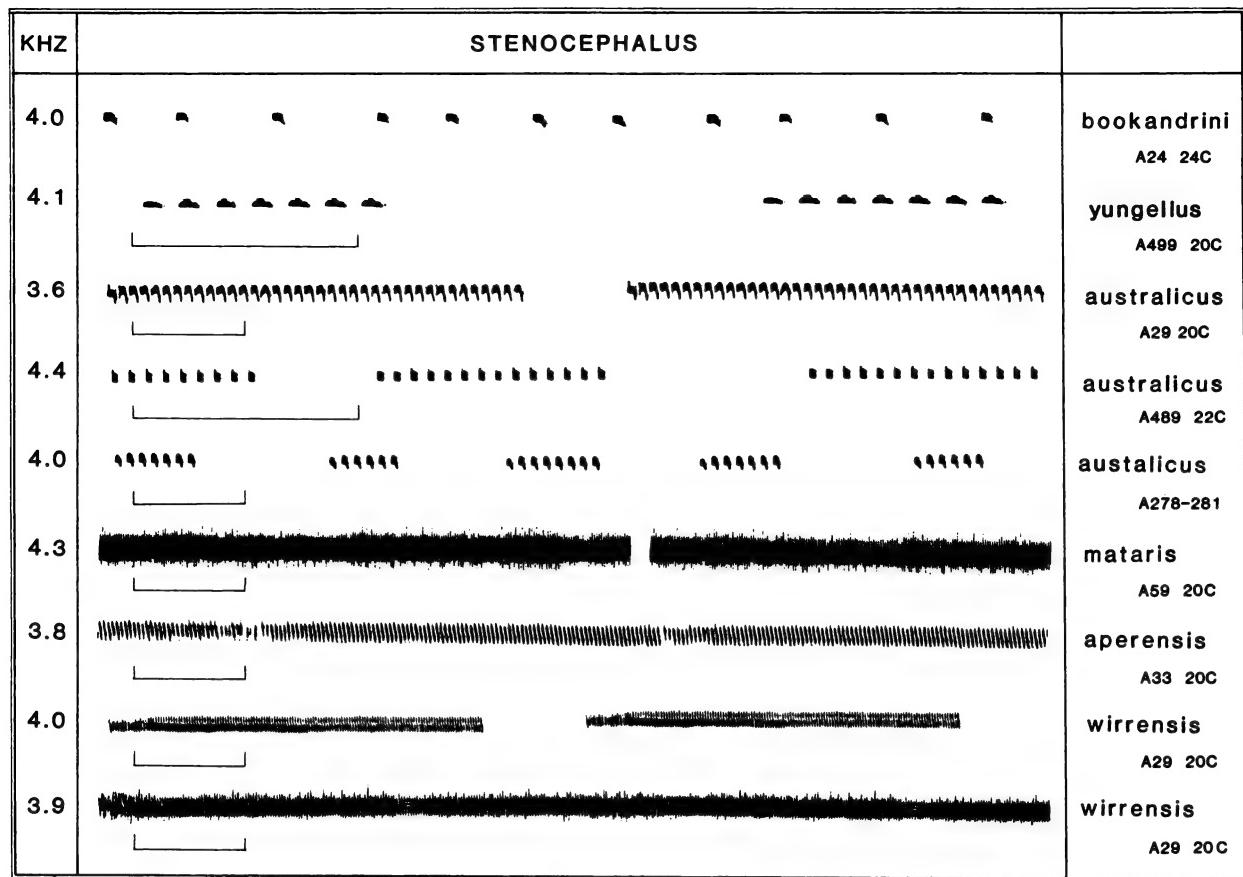
2. FW less than 0.7 times as long as femur III.

KEY TO *STENOCEPHALUS* MALES

NOTE: Because the members of this genus have rather restricted ranges, special attention should be given to geographic distribution when using this key. A specimen which keys out to a given species should, in most instances, be assigned to that species only if it is from the same general region.

1. Epiphallus elongated (Fig. 26D-F). FW less than 0.7 times as long as femur III and less than 2.6 times as long as pronotum. (Patawilyis Group) 2
- Epiphallus broad (Figs. 25, 26AB). FW more than 0.7 times as long as femur (usually more than .85 times as long) and usually more than 2.6 times as long as pronotum. (Australicus Group) 4
2. Harp with 8 or 9 veins. Mirror width more than 1.3 times its length (see Fig. 4 for how measurement is

FIG. 23. Distributions of *Stenocephalus* species.

FIG. 24. *Stenocephalus* songs. Scale = 0.5 s.

- made). File with more than 90 teeth. Genitalia as in Fig. 26E *perrumbis*
 Harp with about 5 veins. Mirror width less than 1.2 times its width. File with less than 90 teeth 3
 3. Genitalia as in Fig. 26D. Femur III less than 1.8 times as long as tibia III *nintenta*
 Genitalia as in Fig. 26F. Femur III more than 1.9 times as long as tibia III *patawilyis*
 4. Harp with 6 or 7 veins 5
 Harp with 4 or 5 veins 8
 5. FW more than 3.2 times as long as pronotum. File with over 200 teeth. Genitalia as in Fig. 25F *yungellus*
 FW less than 3 times as long as pronotum. File with less than 170 teeth 6
 6. Mirror width more than 1.2 times mirror length. Genitalia as in Fig. 26C. FW less than 0.9 times as long as femur III *wookatios*
 Mirror width less than 1.2 times mirror length. FW more than 0.9 times as long as femur III 7
 7. FW more than 2.9 times as long as pronotum. File with less than 100 teeth (91) *aperensis*
 FW less than 2.7 times as long as pronotum. File with more than 120 teeth *australicus*

8. FW more than 3.0 times as long as pronotum 9
 FW less than 2.8 times as long as pronotum 12
9. Body length less than 16 mm; femur III length less than 12 mm 10
 Body length more than 19 mm; femur III more than 14 mm 11
10. File with more than 200 teeth. FW more than 3.4 times as long as pronotum. Genitalia as in Fig. 25A *bookandrini*
 File with less than 70 teeth. FW less than 3.3 times as long as pronotum. Genitalia as in Fig. 25E *mataris*
11. File with more than 160 teeth. Mirror width more than 1.6 times its length. Genitalia as in Fig. 26B ... *yarrami*
 File with less than 70 teeth. Mirror width less than 1.3 times its length. Genitalia as in Fig. 25C *wirrensis*
12. Genitalia as in Fig. 25D *yarata*
 Genitalia as in Fig. 26A *worinta*

AUSTRALICUS GROUP

Nine species make up the Australicus Group. They are: *S. australicus*, *S. wirrensis*, *S. aperensis*, *S. yungellus*, *S. bookandrini*, *S. yarata*, *S. mataris*,

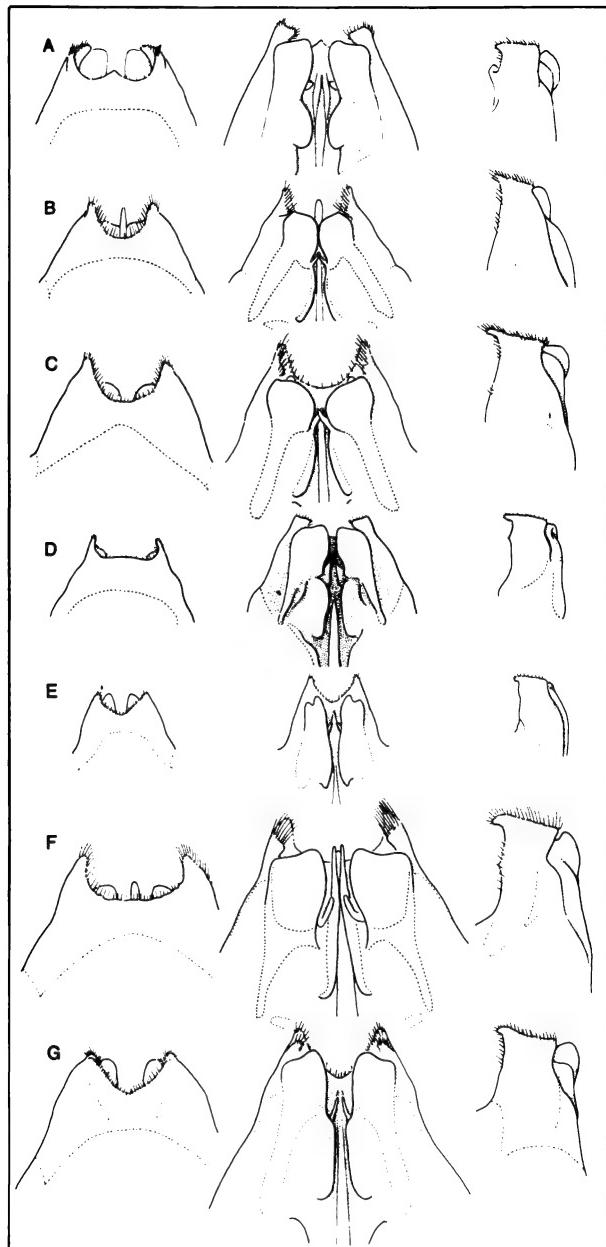


FIG. 25. *Stenocephalus* male genitalia. A, *bookandrini*; B, *aperensis*; C, *wirrensis*; D, *yarata*; E, *mataris*; F, *yungellus*; G, *australicus* A-56.

S. worinta, and *S. yarrami*. The group differs from the Patawilyis Group mainly in the shape of the epiphallus which is relatively short and broad (Fig. 25) and in the length of the FW which is more than 0.7 times as long as femur III (less than 0.7 times as long in the Patawilyis Group).

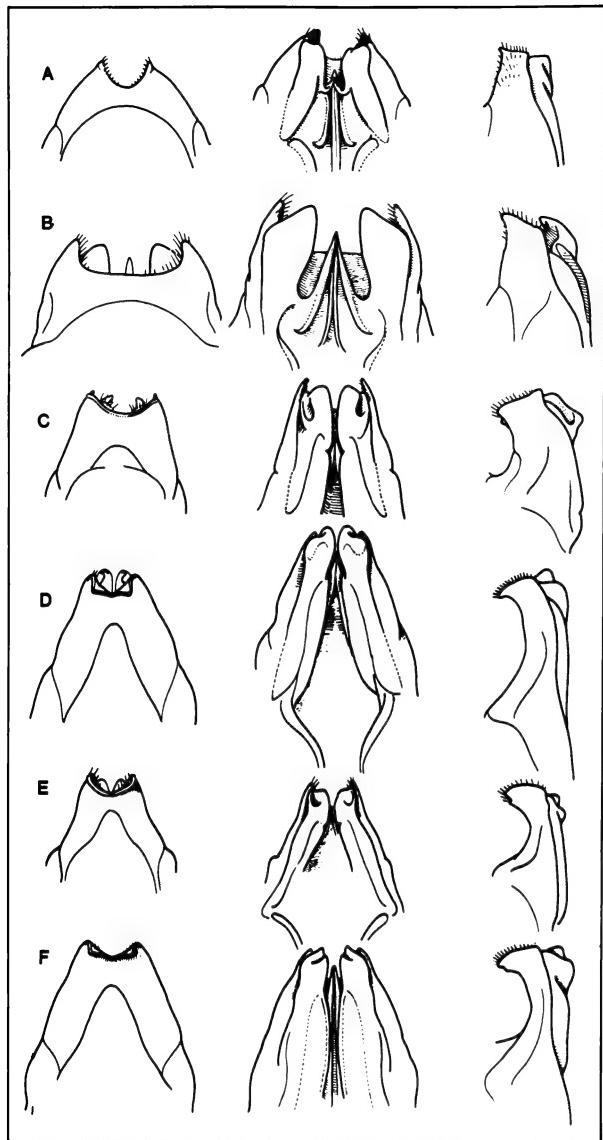


FIG. 26. *Stenocephalus* male genitalia. A, *worinta*; B, *yarrami*; C, *wookatios*; D, *nintenta*; E, *perrumbis*; F, *patawilyis*.

Stenocephalus australicus (Chopard), Figs. 25G, 27E

Cephalogryllus australicus Chopard 1951: 404. Holotype ♂, Kuranda, QLD, December 1926 (Hale and Tindale) SAM. NEW COMBINATION

RANGE. Northern coastal QLD.

RECOGNITION. Males: Size large (body length more than 20 mm; femur III length more than 15 mm). Harp with 6–7 veins. Body slightly pubescent. Genitalia as in Fig. 25G. FW venation as in Fig. 27E. Very similar to *S. wirrensis* and *S. aperensis*.

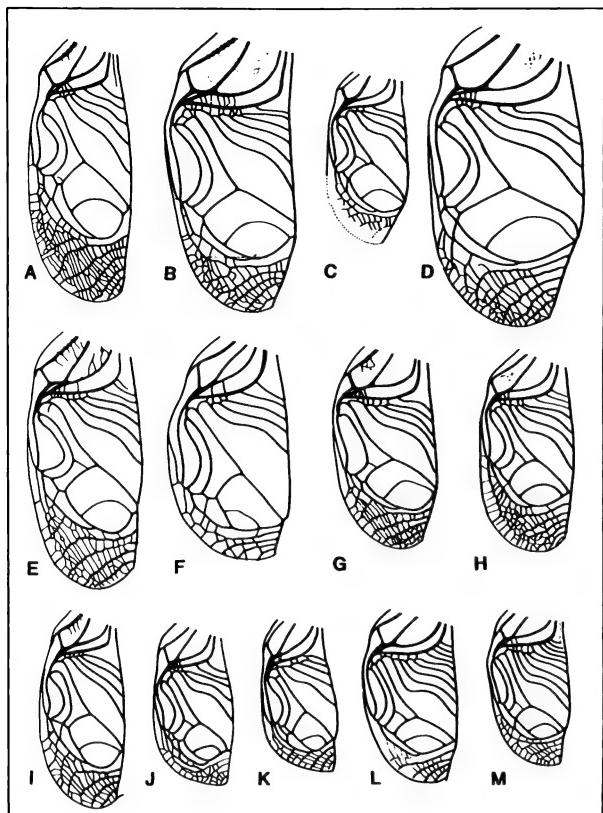


FIG. 27. *Stenocephalus* right FW, dorsal field. A, *wirrensis*; B, *yungellus*; C, *yarata*; D, *yarrami*; E, *australicus*; F, *mataris*; G, *bookandrini*; H, *wookatios*; I, *worinta*; J, *nintenta*; K, *pawilyis*; L, *perrumbis*; M, *perrumbis*.

but with larger number of file teeth—122–167 ($n=7$) as compared to 56–67 for *S. wirrensis* and 91 for *S. aperensis*. Genitalia of these three species very similar. Topotype male fits Chopard's (1951) description in all regards except head narrower than pronotum; pronotum narrowing anteriorly (both features matching Chopard's fig. 1); tibiae III with six subapical spurs on each margin (rather than five as in holotype); right metatarsus III with seven denticles on external margin (otherwise each row has eight denticles, as in holotype). Right tegmen with 7 harp veins. Toothed portion of stridulatory file 4.07 mm long (file same length when viewed from above), with 145 teeth.

Body proportions as follows (holotype proportions in parentheses): Head 0.95 times as wide as front of pronotum. Front of pronotum 0.91 times as wide as back. FW 2.49 (2.56) times as long as pronotum. FW 1.63 times as long as wide. Femur

III 1.69 (1.68) times as long as tibia III. Body length 27 (22) mm; FW length 12.7 (11.5) mm; femur III length 17.9 (16.0) mm; cercal length 13.5 mm.

Females (A–56): Like male in size, coloration, and general body conformation, except tegmina very short and nonoverlapping, barely surpassing mesonotum. Tibiae III with six subapical spurs on each margin. Ovipositor about 1.8 length of abdomen (A–56) and about 1.8 times as long as pronotum.

VARIATION. This is a rather widespread species in northern Queensland. Although there is variation in both song and morphology we are presently inclined to believe that a single species is involved. Variation in file count and song is summarized in the table below. The specimens from Mt. Spec, QLD (A–274–281) had the shortest songs and may eventually prove to belong to a different species. But the genitalic conformation and otherwise similar morphology suggest not.

SONG. Fig. 24. Succession of short to medium trills. Topotype male described above produced 15, 17, 16, 19, 17, 19, 17, 20, 17, 18, 27 pulses per trill, separated by intervals usually a little shorter than trills. Mt. Spec male produced 7–8 pulses/trill ($n=10$) at 1 chirp/s. Trills seemed to be in groups of 5 or 6.

	number file teeth	p/s	p/ch	kps	°C
A-29	146–159	20–22	15–45	3.4–3.8	18
A-489	147	26.3	14+	4.4	22
A-56	141	22.6	38	4.1	21
A-26	113–136	34.0	26	5.2	26
A-274, 281	155–167	18–19	6–8 (1 ch/s)	3.95	19
A-24–25	138–152	no tape	—	—	24

HABITAT. Males sing at night only from leaf litter or perches within 2 feet of ground on tree trunks, vines, or stems in rain forests. At Mt. Spec (A–281) several males were singing low on tree trunks in heavy forest on steep, rocky slopes; others, as at Kuranda, sang from rocks.

SPECIMENS. Holotype ♂ SAM. A-24 2♂ ANSP. A-26 1♂ ANC, 2♂ UM. A-29 5♂ 1♀ ANC. A-56 2♂ ANC. A-56 1♀ ANC.

Stenocephalus wirrensis n. sp., Figs. 25C, 27A

RANGE. Northern coastal QLD.

RECOGNITION. Males; Genitalia as in Figs. 25C.

TABLE 3. Comparison of *Stenocephalus* species. Most measurements are from the holotypes.

	No. file teeth	No. harp veins	FW length pronot. length	FW length femur III length	Fem. III tibia III length tibia III length	Tibia III length BTS III length	Body length (mm)	Femur III length (mm)	Mirror width mirror length
<i>australicus</i>	122-167	6-7	2.49-2.56	0.71-0.72	1.68		22-27	16-18	1.04
<i>wirrensis</i>	56-67	5	3.84	1.06	1.60		25	15.5	1.14
<i>aperensis</i>	91	6-7	2.94	0.86	1.64	2.31	18	12	
<i>bookandrini</i>	230	5	3.60	1.00	1.61	2.23	15.5	11	1.26
<i>yungellus</i>	238-254	6-7	3.48	0.90	1.61		25	17.5	1.32
<i>yarata</i>	70	4	2.69		1.63	2.00	15	11	1.12
<i>mataris</i>	55	5	3.18	0.96	1.78	1.92	12	7.5	1.20
<i>worinta</i>	66	4	2.50	0.85	1.59	2.16	16	12.3	1.05
<i>yarrami</i>	186, 187	4-5	3.38	1.00	1.42		21	16	1.72
<i>wookatios</i>	92, 98	6-7	2.89	0.95	1.64	1.96	20	10.5	1.27
<i>patawilyis</i>	73	5	2.18	0.50	2.07	1.45	26	16	1.04
<i>nintenta</i>	80	5	2.53	0.61	1.67	1.96	20	14	1.15
<i>perrumbis</i>	98	8-9	2.56	0.67	1.64	1.91	19	12	1.42-1.62

File with 56, 64 teeth (n=2). Harp with 5 veins. Song a succession of 1-2 second trills with very fast pulse rate. Top of head and thorax dark reddish-brown. Lateral lobes pale in lower half. FW's extending nearly to base of cerci. HW's barely surpassing end of abdomen. File with 56 teeth (male from A-29 has 64 teeth). FW's as in Fig. 27A. Tibia III with 6-7 outer, 6-7 inner subapical spurs. Basitarsus III with 7-9 teeth in each dorsal row. Holotype measurements: Head width 1.0 times as wide as anterior width of pronotum. Front of pronotum 0.81 times as wide as back. FW 3.84 times as long as pronotum. FW length 2.70 times its greatest width. Femur III 1.60 times as long as tibia III. Tibia III 1.41 times as long as tarsus III. Body length ca. 25 mm. FW length 16.5 mm; femur III 15.5 mm; tibia III 9.7 mm; cerci 12.2 mm.

HOLOTYPE. ♂, A-33, Lyons Lookout, just south of Mossman, QLD, 5 viii 1968, ANC.

SONG. Males sing at night on ground or on logs or tree trunks near ground in rain forests. Succession of trills, 1-2 seconds in length, separated by breaks of similar length or slightly shorter; neither trills nor breaks of regular length (Fig. 24).

p/s	chirp length	chirp interval	kps	°C
A-29	84.0	1-2 s	0.8-2.0 s	3.9
A-29	84.6			3.95
A-33	89.0			4.1
A-33	ca. 100.0			3.7
				21

HABITAT. Rain forest. Males sing on ground, logs, or tree trunks.

SPECIMENS. Holotype ♂ ANC. A-26 1♂ ANC. A-29 1♂ ANC, 1♂ ANSP.

Stenocephalus aperensis n. sp., Fig. 25B

RANGE. Northern coastal QLD.

RECOGNITION. Males: Difficult to distinguish from *S. wirrensis* on the basis of superficial morphology. File of holotype with 91 teeth. Harp with 6-7 veins. Song more continuous trill with slower pulse rate than *S. wirrensis*. Wing venation similar to *S. wirrensis*. FW of a female about $\frac{1}{2}$ the length of the pronotum and ovipositor as long as femur III. Two males and a female presumed to belong to this species from Mt. Edith, QLD. Genitalia like those of holotype and file of one male has 107 teeth. Identity of these specimens uncertain until songs are known. Holotype measurements: File with 91 teeth. Head 1.0 times as wide as front of pronotum. Front of pronotum 0.78 times as wide as back. FW 2.94 times as long as pronotum and 2.24 times as long as wide. Femur III 1.64 times as long as tibia III. Tibia III 2.31 times as long as basitarsus III. Body length 18.0 mm; FW length 10.3 mm; femur III length 12.0 mm; cercal length 7.6 mm.

Females: FW's semicircular, 0.67 times as long as pronotum. Femur III 3.7 times as long as pronotum. Ovipositor about as long as femur III. Tibia III with 5 inner and 5 outer subapical spurs. Femur III length 15 mm; cercal length 12 mm.

HOLOTYPE. ♂, A-33, Lyons Lookout, on hill just south of Mossman, QLD, 5 viii 1968, ANC.

SONG. Fig. 24. More or less continuous trill.

	p/s	kps	°C
A-33	51	3.8	20

HABITAT. On or near ground in rain forests.

SPECIMENS. Holotype ♂ ANC. Mt. Edith, 3500 ft, 2 mi N Tinarnoo Dam, QLD, 2 vi 1972 (Monteith) 2♂ 1♀ UQC.

Stenocephalus bookandrinii n. sp., Figs. 25A, 27G

RANGE. Type locality in northern coastal QLD.

RECOGNITION. Males: Stridulatory file with ca. 230 teeth. Genitalia as in Fig. 25A. FW's extend at least to base of cerci. Song a very slow trill. Harp with 5 veins. Body length ca. 15 mm. Body color brown to light brown, head somewhat more reddish. Head 0.97 times as wide as front of pronotum. Front width of pronotum 0.85 times back width. FW 3.6 times as long as pronotum. FW extending to end of abdomen. FW length 1.89 times its greatest width. Femur III 1.61 times tibia III. Tibia III 2.23 times as long as basitarsus III. FW with 5 harp veins. File with 234 teeth. Legs I and II pale. Tibia III, left with 5 subapical spurs on each margin, right with 6. Basitarsus III with 7–8 teeth in each dorsal row. Body length 15.4 mm; FW length 10.8 mm; femur III 10.8 mm; tibia III 6.7 mm; cerci over 6.2 mm (broken).

HOLOTYPE. ♂, A-24, forest along road to Mission Beach, near Tully, QLD, 1 viii 1968, ANC.

SONG. Fig. 24. Continuous trill with long, widely spaced pulses.

	p/s	kps	°C
A-24	2.5	4.0	21

HABITAT. Males seem to sing only at night; few males singing among fallen dry foliage of fan palms in coastal rain forest in which soil surface was nearly covered with several layers of such debris. We did not hear more than 2–3 males on any of the three occasions we visited this spot, and we did not encounter the species elsewhere.

SPECIMENS. Holotype ♂ ANC.

Stenocephalus yungellus n. sp., Figs. 25F, 27B

RANGE. Type locality in central coastal QLD.

RECOGNITION. Males: Similar to *S. australicus*

and *S. wirrensis* but legs mostly dark brown. File with 230–250 teeth (n=5). Genitalia as in Fig. 25F. FW venation as in Fig. 27B. Song comprised of short, loud trills with pulse rate near 10 p/s. Harp with 6–7 veins. Body length more than 20 mm. Appendages mostly dark brown; bars on femora III occupying most of their external surface except near bases. Head and pronotum very dark brown except for pale areas laterally, near sutures, and around ocelli; tegmina exposing three abdominal tergites. HW's not exceeding metanotum. Holotype measurements: Stridulatory vein 5.6 mm long from above, toothed portion, 5.65 mm long with 260 teeth spaced 38 per mm near center. Tibiae III with 6 subapical spurs on each margin. FW 3.48 times as long as pronotum. Femur III 1.61 times as long as tibia III. Body length 25.3 mm; FW length 16.0 mm; femur III 17.7 mm; tibia III 11.0 mm; cerci 13.1 mm.

Four other males similar in size, proportions, coloration, and collected at the same time and place singing same song had stridulatory tooth counts as follows: 238, 240, 250, 254.

HOLOTYPE. ♂, A-499, Eungella National Park, QLD, 20 ii 1969, ANC.

SONG. Fig. 24. Succession of short, loud trills with slow pulse rate. Trills delivered irregularly about one per second.

	p/s	p/tr	tr/s	kps	°C
A-499	12.2	5–8	ca. 1	4	20

HABITAT. Large numbers began singing rather suddenly about 1:30 a.m. on a foggy cool night after we had been in the area about 20 minutes. Start coincided with onset of light sprinkling rain, and during subsequent hour or more of steady downpour large numbers sang. Captured males sang on tree trunks a few feet above the ground, but others in grass on steep banks along road through rain forest. Hundreds of males heard in several miles of driving through rain forest.

SPECIMENS. Holotype ♂ ANC. Same data as holotype 3♂ ANC, 1♂ ANSP.

Stenocephalus yarata n. sp., Figs. 25D, 27C

RANGE. Type locality N of Cairns, QLD.

RECOGNITION. Males: Very similar to *S. wirrensis* and *S. aperensis* but considerably smaller. Only existing male has 70 file teeth (left FW). Harp with 4 distinct veins. Genitalia as in Fig. 25D. FW ve-

nation as in Fig. 27C. Body length ca. 15 mm. Femur III length ca. 11 mm. File with 70 teeth. Head 1.08 times as wide as front of pronotum. Front of pronotum 0.84 times as wide as back. FW 2.69 times as long as pronotum and 1.65 times as long as wide. Femur III 1.63 times as long as tibia III. Tibia III 2.0 times as long as basitarsus III. Tibia III with 4 internal and 4 external subapical spurs. Body length ca. 15 mm; femur III length ca. 11 mm.

HOLOTYPE. ♂, Ellis Beach, N of Cairns, QLD, 15 viii 1966 (D. Smith) UQC.

SONG. Not known.

SPECIMENS. Holotype ♂ UQC.

Stenocephalus mataris n. sp., Figs. 25E, 27F

RANGE. Type locality in northern coastal QLD.

RECOGNITION. Males: A small member of the genus. Body length ca. 12 mm. Most similar to *S. worinta*, found in same area, but differing in shape of genitalia and wing venation. Song very fast pulse trill. Song of *S. worinta* not known. Head and pronotum reddish-brown, legs pale. FW's extend well beyond middle of abdomen but do not reach cerci. Head 1.0 times as wide as front of pronotum. Front of pronotum 0.83 times as wide as back. FW 3.18 times as long as pronotum and 1.67 times as long as wide. Femur III 1.78 times as long as tibia III. Tibia III with 6 subapical spurs (1st one small) and 1.92 times as long as basitarsus III. Body length 12 mm; FW length 7 mm; femur III 7.3 mm; cerci ca. 7 mm. Holotype with 55 file teeth.

HOLOTYPE. ♂, A-59, 20 miles north of Daintree River (near Mossman) QLD, 3 ix 1968, ANC.

SONG. Fig. 24. Smooth continuous trill with very high pulse rate.

	p/s	kps	°C
A-59	94	4.3	20

HABITAT. Rain forest.

SPECIMENS. Holotype ♂ ANC.

Stenocephalus worinta n. sp., Figs. 26A, 27I

RANGE. Type locality in northern coastal QLD.

RECOGNITION. Males: Superficially similar to *S. yarata* but differing slightly in shape of epiphallus. Also similar to *S. mataris* but differing from that species in shape of genitalia and wing venation. File of only existing male has 66 teeth. Harp with 4 distinct veins. Body length 16 mm. FW venation as in

Fig. 27I. File with 66 teeth. Head 0.95 times as wide as front of pronotum. Front of pronotum 0.95 times as wide as back. FW 2.50 times as long as pronotum and in length 1.73 times its greatest width. Femur III 1.59 times as long as tibia III. Tibia III 2.16 times as long as basitarsus III. Tibia III with 4–5 internal and 5–6 external subapical spurs. Body length 16 mm; FW length 10.5 mm; femur III 12.3 mm; cerci 9.0 mm.

HOLOTYPE. ♂, Cooper Creek, 10 miles north of Daintree River, QLD, 2 v 1970 (G. B. Monteith) UQC.

SONG. Not known.

HABITAT. Rainforest floor.

SPECIMENS. Holotype ♂ UQC.

Stenocephalus yarrami n. sp., Figs. 26B, 27D

RANGE. Southeastern QLD.

RECOGNITION. Males: Large species somewhat similar to *S. australicus* and *S. wirrensis*, but with very broad FW's with mirror more than 1.5 times as wide as long. Harp with 4–5 distinct veins. Genitalia also distinctive (Fig. 26B). File of holotype with 186 teeth, that of a paratype with 187 teeth. Holotype measurements: Head 0.87 times as wide as front of pronotum. Front of pronotum 0.71 times as wide as back. FW 3.38 times as long as pronotum and with length 1.72 times its greatest width. Femur III 1.42 times as long as tibia III. Tibia III with 6–7 external subapical spurs. Body length ca. 21 mm; femur III 16 mm; FW length 16 mm.

HOLOTYPE. ♂, Granite Creek, 700', Bulburin State Forest, via Many Peaks, QLD, 1 iv 1972 (S. R. Monteith) UQC.

SONG. Not known.

SPECIMENS. Holotype ♂ UQC. Woowoonga Range, 450–600 m, ca. 10 km NE Biggenden, QLD, ii–iii 1971 (Frauca) 1♂ ANC.

PATAWILYIS GROUP

Four species are included in this group: *S. patawilyis*, *S. nintenta*, *S. perrumbis* have elongated epiphalli, and *S. wookatios* has the epiphallus somewhat less elongated. All four species are from the upper third of Cape York Peninsula.

Stenocephalus patawilyis n. sp., Figs. 26F, 27K

RANGE. Type locality in extreme tip of Cape York Peninsula.

RECOGNITION. Males: FW's reaching about middle of abdomen. Head about as wide as pronotum.

Pronotum not widening posteriorly. Epiphallus decidedly elongated. File with ca. 73 teeth. Mirror relatively small. Harp with 5 veins. FW's 2.18 times as long as pronotum and 1.60 times as long as wide. File with 73 teeth. Femur III 2.07 times as long as tibia III. Tibia III 1.45 times as long as basitarsus III. Tibia III with 6 external subapical spurs. Body length ca. 26 mm; FW length ca. 8 mm; femur III 16 mm; cerci ca. 10 mm.

Females: FW's very short, not reaching 3rd thoracic segment. Similar to males in color and size. Ovipositor about 4.45 times as long as pronotum and 1.11 times as long as femur III.

HOLOTYPE. ♂, Lockerbie Scrub, Cape York Peninsula, QLD, 14–18 iv 1973 (G. B. Monteith) UQC.

SONG. Not known.

HABITAT. Scrub forest near Lockerbie.

SPECIMENS. Holotype ♂ UQC. 11♀ from same locality as holotype collected in April, May, June (Monteith) UQC.

Stenocephalus nintenta n. sp., Figs. 26D, 27J

RANGE. Type locality in northern tip of Cape York Peninsula.

RECOGNITION. Males: Only existing male differs from *S. wookatios* in genitalia and from *S. perrumbis* in number of harp veins and genitalia. FW's extend just beyond middle of abdomen. Harp with 5 veins. File with 80 teeth. Head 0.89 times as wide as front of pronotum. Front of pronotum 0.93 times as wide as back. FW 2.53 times as long as pronotum and with length 1.85 times its greatest width. Femur III 1.67 times as long as tibia III. Tibia III 1.96 times as long as basitarsus III. Body length 20 mm; FW length 8.5 mm; femur III 14 mm; cerci ca. 10 mm.

HOLOTYPE. ♂, Somerset, Cape York Peninsula, QLD, 16–17 iv 1973 (G. B. Monteith) UQC.

SONG. Not known.

HABITAT. Not known.

SPECIMEN. Holotype ♂ UQC.

Stenocephalus perrumbis n. sp., Figs. 26E, 27L

RANGE. Type locality in vicinity of Iron Range, Cape York Peninsula.

RECOGNITION. Males: Epiphallus elongated as in *S. patawilyis*, but FW reaches beyond middle of abdomen. File with ca. 98 teeth. Pronotum widens posteriorly. Superficially most similar to *S. wookatios*, but differing from that species in shape of genitalia and in having 8–9 harp veins. This species

and *S. wookatios* possibly merely geographic variants of same species. Holotype measurements: Head 0.92 times as wide as front of pronotum. Front of pronotum 0.93 times as wide as back. FW 2.56 times as long as pronotum and 1.70 times as long as wide. Femur III 1.64 times as long as tibia III. Tibia III 1.91 times as long as basitarsus III. File with 98 teeth. Body length 18.5 mm; FW length ca. 8 mm; femur III 12 mm; cerci ca. 9.5 mm.

HOLOTYPE. ♂, Iron Range, Cape York Peninsula, QLD, 26–31 v 1971 (G. B. Monteith) UQC.

SONG. Not known.

HABITAT. Rain forest.

SPECIMENS. Holotype ♂ UQC. Same place, 5–10 v 1968 (Monteith) 1♂ UQC.

Stenocephalus wookatios n. sp., Figs. 26C, 27H

RANGE. Eastern side of northern Cape York Peninsula.

RECOGNITION. Males: FW not quite reaching bases of cerci. Genitalia as in Fig. 26C. File with 92 (holotype) and 98 teeth. Body length ca. 19 mm; femur III length ca. 13 mm. Harp with 6–7 veins. Holotype measurements: Head 0.96 times as wide as front of pronotum. Front of pronotum 0.89 times as wide as back. FW 2.89 times as long as pronotum and 1.83 times as long as wide. Femur III 1.64 times as long as tibia III. Tibia III 1.96 times as long as basitarsus III. Tibia III with 6 external subapical spurs. Body length 20 mm; FW length 10 mm; femur III 10.5 mm; cerci ca. 11 mm.

Females: FW's very short, about 0.5 times as long as pronotum and just reaching third thoracic segment. Head as wide as pronotum. Ovipositor 0.92 times as long as femur III. Body length 17–18.5 mm. Femur III 14 mm.

HOLOTYPE. ♂, Jardine River, Cape York Peninsula, QLD, 15–17 vi 1969 (G. B. Monteith) UQC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ UQC. Same data, 2♀ UQC. Iron Range, QLD, 10 iv 1964 (Common, Upton) 1♂ ANC.

Genus **APTEROGRYLLUS** Saussure

Apterogryllus Saussure 1877, v. 25: 109. Type species: *Apterogryllus brunnerianus* Saussure, by monotypy.
Scapanonyx Chopard 1925: 10. Type species: *Scapanonyx palpatus* Chopard, by monotypy. NEW SYNONYM.



FIG. 28. *Apterogryllus palpatus* female (male similar).

Other than the type, only one species has previously been placed in this genus, *A. deplanatus* Brunner, from Rangoon; and Chopard (1967) says that the specimen involved is a juvenile *Brachytrupes*. Kirby (1906), apparently erroneously, lists the type species as *Brachytrupes pedestris* Walker (1869: 13), from N. Australia.

Scapononyx is synonymized here because the single described species shares its unusual labial palpi with all other *Apterogryllus* except *A. brunnerianus*. *A. palpatus* is indeed different in ovipositor shape and relative width of the apical spur on the foretibiae (see species key), but these differences probably do not yield a useful generic separation in such a small group.

In this work we studied 19 species which can be assigned to two species groups, the Palpatus Group and the Brunnerianus Group. However, we believe that the genus could very well be rich in

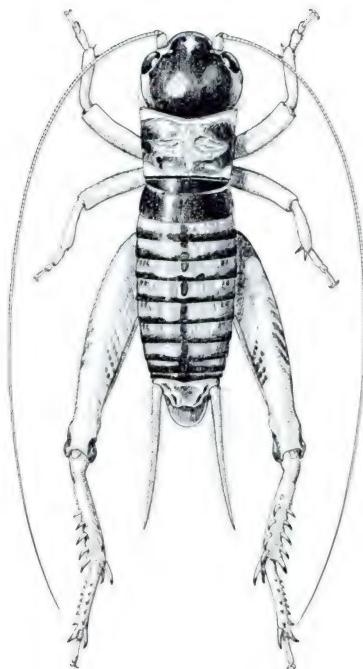


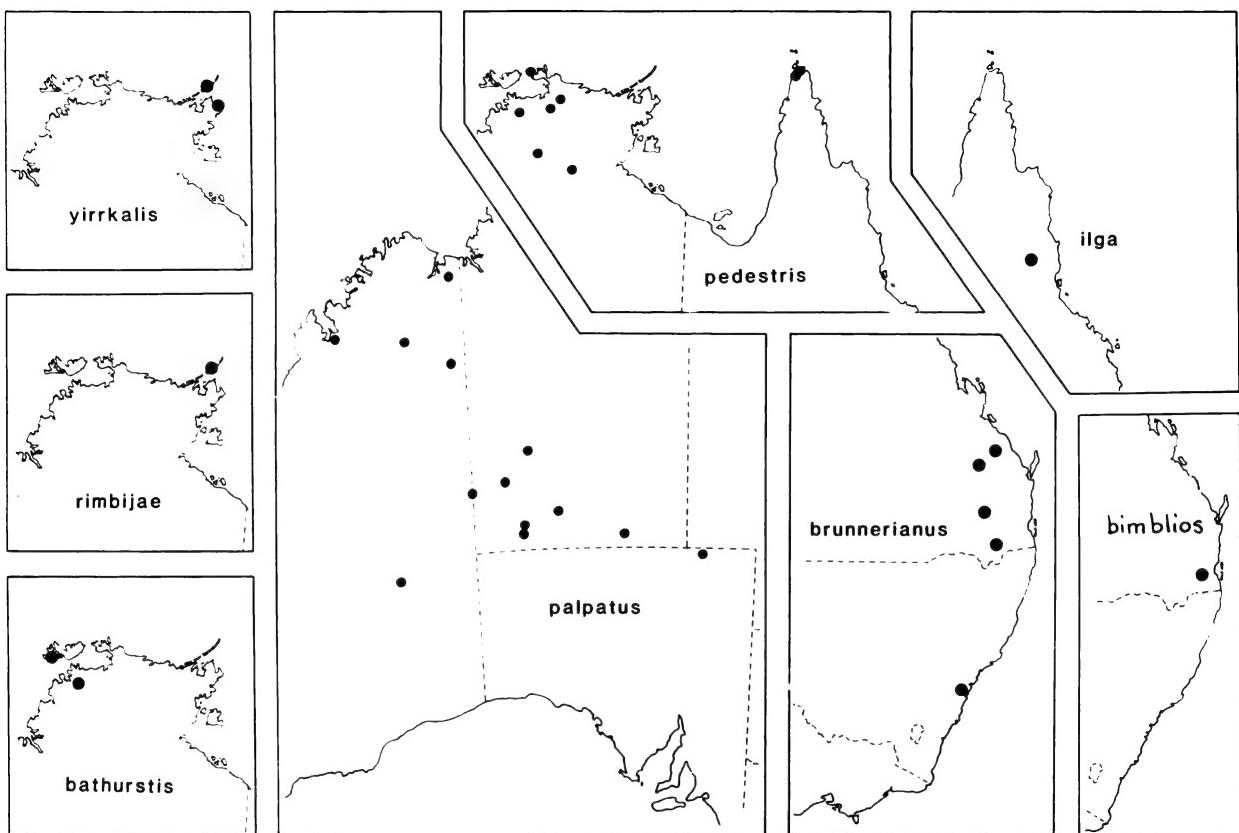
FIG. 29. *Apterogryllus brunnerianus* male.

numbers of species. Since they are wingless, it seems possible that populations could easily form isolated populations and result in a more diverse fauna than a comparable winged group. With the development of efficient collecting techniques this group should present future biologists with exciting and challenging taxonomic and biogeographic problems.

RECOGNITION. Both sexes without wings. In individuals checked there are minute wing pads located beneath posterior margin of pronotum. Tibiae I without tympana. Median ocellus obsolete or poorly developed with frons sometimes showing only a color change in vicinity of median ocellus. Posterior and anterior margins of pronotum concave. Femur III length between 1.66 and 1.93 times as long as tibia III. Tibia I with 3 and tibia II with 4 apical spurs. Last (lowest) apical spur on tibia III very small compared to the preceding two.

BIOLOGY. These sometimes large, round-bodied, wingless crickets live in deep burrows in the hard clay soil of dry woodlands. They may be abundant, for burrows that we assumed to be occupied by *Apterogryllus* are extensively distributed and often number 15–20 in an area no more than 10 feet square. During the dry months, the large juveniles

APTEROGRYLLUS

FIG. 30. *Apterogryllus* distributions.

seem to remain near the bottoms of their burrows, up to at least two feet below the soil surface. Most burrows are plugged with dry, powdery clay about an inch below the surface, probably through activity following the last rain. The burrows are cylindrical with noticeable heaps of excavated material around the entrances. Rarely two entrances lead to the same burrow. Several inches below the surface (up to a foot), an enlarged chamber is usually filled with cut leaves, seeds, and other organic material, which may serve as food during the cricket's self-interment in the dry season. In one or two cases we found what appeared to be short blind burrows packed with fecal pellets. Below the provision chamber a tunnel usually could be found extending more or less straight downward for a foot or more.

We do not know if these crickets normally come to the surface during the dry season, but some bur-

rows seem not to be plugged. All individuals seen on the surface were taken near spots where several burrows had been flooded or partly excavated. Flooding after partial excavation caused most individuals to work near the burrow entrance so that a shovel, trowel, or wide knife blade could be stabbed in quickly enough to prevent retreat. We did not find more than a single cricket in one burrow.

Life cycles of these crickets are unknown, but their occurrence in xeric locales suggests a dry season juvenile diapause, and one wonders if the length of such depend upon the occurrence of rain, and its amount, sometimes giving a multiple year life cycle. Diapauses of facultative or indeterminate length seem most likely to evolve in situations in which adequate or optimal periods for growth or for adult activities are widely spaced and unpredictable.

Palpatus Group

1. Last segment of labial palpi longer than last segment of maxillary palpi.
2. Last segment of labial palpi with a fringe of setae (Fig. 32E) (except *alkina*).

Brunnerianus Group

1. Last segment of labial palpi shorter than last segment of maxillary palpi.
2. Last segment of labial palpi not strongly setose.

PALPATUS GROUP

The members of this group have the last segment of the labial palpi longer than the last segment of the maxillary palpi and both the labial palpi and the galea have a dense fringe of setae. The apical spurs on tibia I are flattened and have rather sharp cutting edges.

palpatus (western interior of Australia)

1. Body strongly constricted at junction of pronotum and abdomen (Fig. 28).
2. Body length 16–22 mm (δ), 18–25 mm (φ).
3. Ovipositor shorter than femur III, 1.9–2.2 times as long as pronotum (at center).
4. Tibia III with 4–7 inner and 3–5 outer subapical spurs.
5. Pronotum smooth, shiny.

pedestris (northern NT and northern Cape York)

1. Body not as in *palpatus*.
2. Body length 22–33 mm (δ , φ).
3. Ovipositor longer than femur III, 2.6–3.4 times as long as pronotum (at center).
4. Tibia III with 5 inner and 5–6 outer subapical spurs.
5. Pronotum sometimes shiny sometimes finely rugose and not shiny.

rimbijaе (known only from islands off Arnhem Land)

1. Body not constricted but narrowing continuously caudally (Fig. 32H).
2. Body length of δ ca. 27 mm.
3. Ovipositor length not known.
4. Tibia III with 4 inner and 5 outer subapical spurs.
5. Pronotum finely rugose in part and shiny.

bathurstis (extreme NW NT)

1. Body not strongly constricted as in *palpatus*.
2. Body length of female 35–40 mm (male unknown).
3. Ovipositor longer than femur III, 3.7–3.8 times as long as pronotum.
4. Tibia III with 4–5 inner and 5 outer subapical spurs.
5. Pronotum and abdomen shiny.

yirrkalis (extreme NE NT)

1. Body not as in *palpatus*.
2. Body length of female 17–19 mm (males not known).
3. Ovipositor shorter than femur III, 2.7–2.8 times as long as pronotum.
4. Tibia III with 5 inner and 4–5 outer subapical spurs.
5. Pronotum velvety, not shiny.

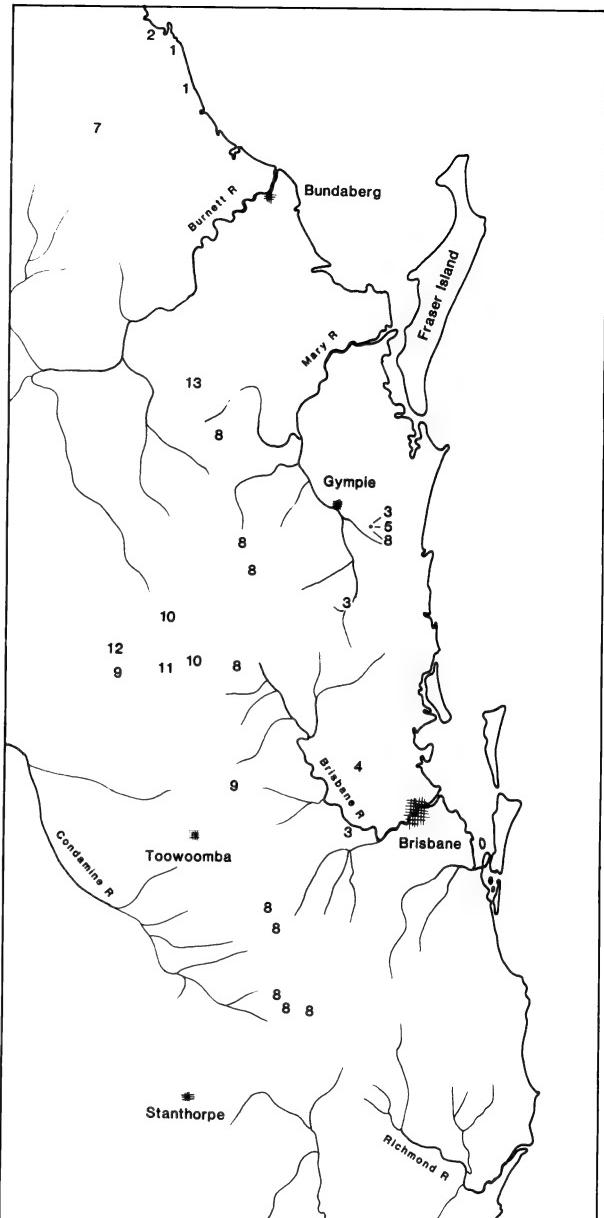
alkina (eastern coastal QLD)

FIG. 31. Distribution of southeast Queensland *Apterogryllus* species based mainly on pitfall trapping by the Monteiths. 1, *alkina*; 2, *moomooma*; 3, *durakai*; 4, *bimblios*; 5, *kanandah*; 7, *yuraraba*; 8, *coorani*; 9, *midgee*; 10, *nanango*; 11, *nyrang*; 12, *paranyrang*; 13, *neonyrang*.

1. Body not as in *palpatus*.
2. Body length 21–28 mm (δ), 24–29 mm (φ).
3. Ovipositor longer than femur III.
4. Tibia III with 5 inner and 4–5 outer subapical spurs.

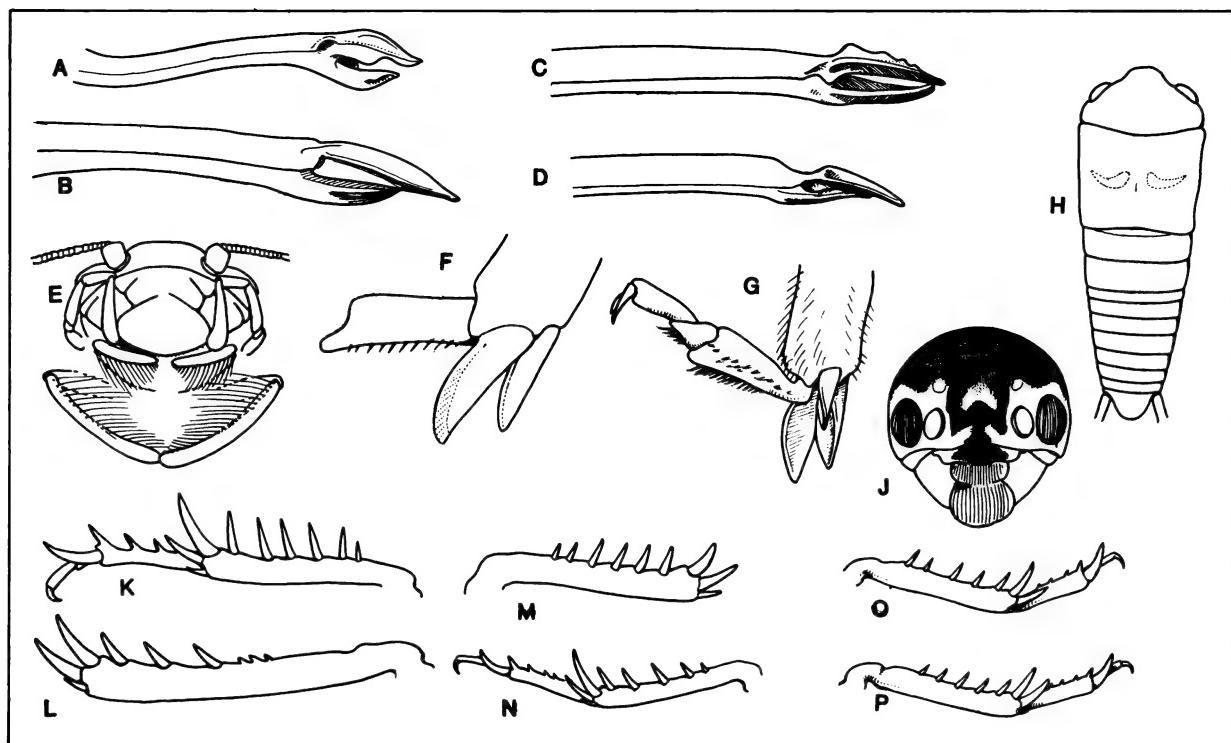


FIG. 32. *Apterogryllus*. A, *palpatus* ovipositor, Gahnda Rockhole; B, *palpatus* ovipositor, Amadeus Basin NT; C, *brunnerianus*, Bald Mt; D, *yirrkalis* holotype; E, *pedestris*, view of lower part of mouth parts; F, *palpatus* ♀, tibia I spines; G, *palpatus* ♂, leg I; H, *rimbijae* body shape; J, *brunnerianus* head; K, *brunnerianus* tibia III inner; L, *bimbleios* tibia III outer; M, *brunnerianus* tibia III outer; N, *barrani* tibia III inner; O, P, *palpatus* tibia III inner and outer resp.

5. Ovipositor longer than femur III, 3.6–3.8 times as long as pronotum (at center).

Apterogryllus palpatus (Chopard), Figs. 28, 32ABFGOP, 33A

Scapanonyx palpatus Chopard 1925: 10. Holotype ♀, Derby, WA, sm. Type examined.

RANGE. Central Australia to Northeastern WA.

RECOGNITION. Body strongly constricted in region of second pair of legs and pronotum much wider in front than back (Fig. 28). Top of head usually orange-brown. Top of pronotum often dark brown to blackish. Similar to *A. pedestris* in having last segment of labial palpi longer than last segment of maxillary palpi and in having long hairs on labial palpi and galea (Fig. 32E). Genitalia as in Fig. 33A. Tibia I with flattened apical spurs with cutting edges (Fig. 32FG). Ovipositor 1.9 to 2.2 times as long as pronotum. Femur III 1.71 to 1.75 times as long as

tibia III. Tibia III 2.0 to 2.4 times as long as basitarsus III. Tibia III with 3–5 outer and 4–7 subapical spurs (Figs. 32OP). Body length of males 16–22 mm; females 18–25 mm.

HABITAT. In burrows through much of interior of Australia.

SPECIMENS. Holotype ♀ BM. WESTERN AUSTRALIA. Kimberley Research Station, ii 1952 (Bornemissa) 1♀ ANC. 12 mi ENE Juniper Well, 4 iv 1963 (Chinnick) 1♂ ANC. 8 mi S Lansdowne HS, 24 viii 64 (Plumb) juv ANC. Near Giles, 1960 (Gilmour) 1♂ ANC. 17 mi ESE of Giles, 26 iii 1963 (Chinnick) 1♀ ANC. 9 mi SSE of Gordon Downs HS, 13 iv 1963 (Chinnick) 1♀ ANC. Gahnda Rockhole, 1–2 ii 1963 (M. J. D. White) 1♀ ANC. NORTHERN TERRITORY: Tempe Downs HS, 10 ix 1963 (Ranford) 1♂ ANC. Ehrenberg Range, 50 mi E of Sandy Blight Junction, 6 iv 1963 (Chinnick) 3♀ ANC. 3 mi NW of Mt. Doreen HS, 10 iv 1963 (Chinnick) 1♀ ANC. 13 km NE of Andado HS, 27 ix 1972 (Key) 1♀ 2juv ANC. 37 mi SSW Sandy Blight Junction, 31 iii 1963 (Chinnick) juv ANC. Near Reedy Rockhole, Amadeus Basin, 26 ix 1962 (Ranford) 1♀ 1juv ANC. 33 mi E Ayers Rock, 20 xi 1977 (Upton, Feehan) 1j♀ ANC. SOUTH AUSTRALIA:

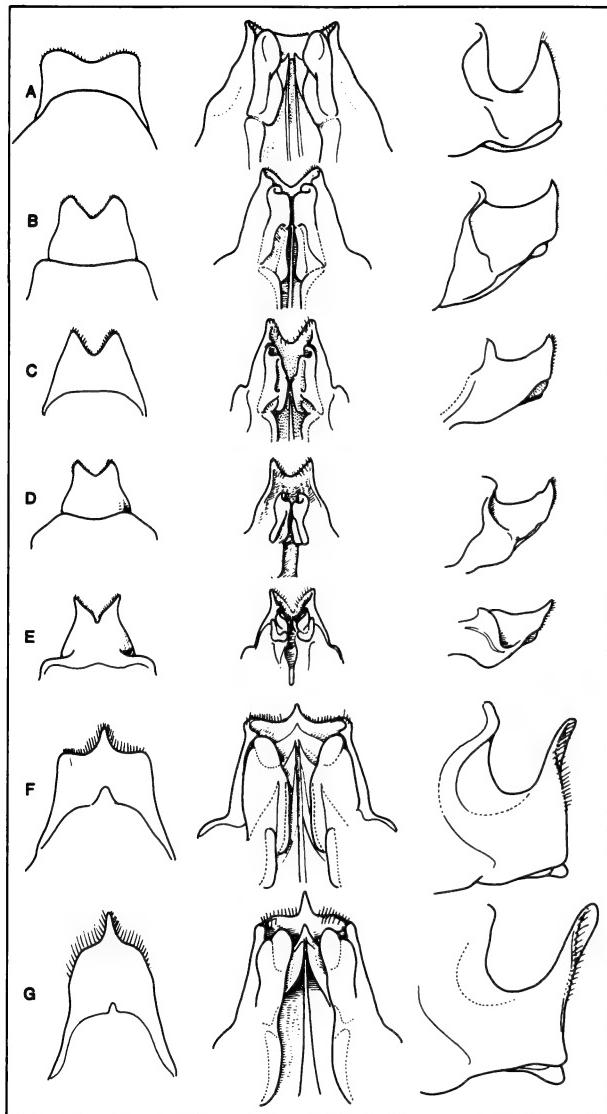


FIG. 33. *Apterogryllus* male genitalia. A, *palpatus* Juniper Well WA; B, *brunnerianus* near Bell QLD; C, *brunnerianus* A-517; D, *brunnerianus* Eidsvold; E, *bimblios*; F, *pedestris* Cobourg Peninsula; G, *rimbijae*.

Alton Downs (Old) HS, (WSW of Birdsville, QLD) 19 ix 1972
(Key) 1♂ ANC.

Apterogryllus pedestris (Walker), Figs. 32E, 33F

Brachytrypes pedestris Walker 1869: 13. Holotype juvenile ♀, Port Essington, northeast of Darwin, Northern Territory, BM. Holotype bears the following labels: green type label then round label with "Port Essington," then a label with "Brach."

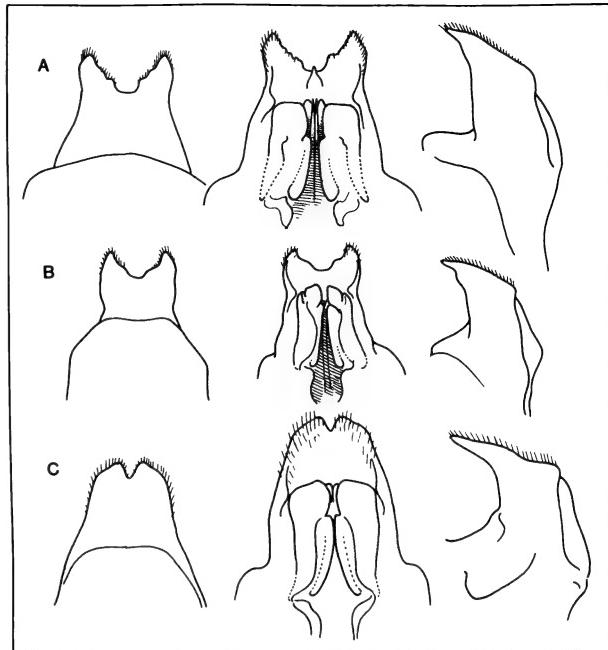


FIG. 34. *Apterogryllus*. A, *alkina* holotype; B, *durakai* holotype; C, *moomooma* holotype.

one of Walker's series so named; then *pedestris*." Chopard 1951 synonym.

Apterogryllus rugosus Chopard 1951: 402. Holotype ♂, Darwin, Northern Territory, SAM. Type examined. NEW SYNONYM.

RANGE. Northern NT and northern tip of Cape York Peninsula.

RECOGNITION. Body color brown to rusty red. Legs usually pale brown to tan. Body length 30 mm or more. Body not as strongly constricted as in *A. palpatus*. Male genitalia as in Fig. 33F. Last segment of labial palpi distinctly longer than last segment of max. palpi. Labial palpi and galea of maxillae with very long hairs as in *A. palpatus*. Tibia III usually with 5 inner and 5–6 outer subapical spurs and basitarsus III with 4 inner and 6 outer spines dorsally. Ovipositor 2.6–3.4 times as long as pronotum and 0.88 to 1.16 times as long as femur III. Pronotum usually finely rugose.

HABITAT. Dug out of packed soil on aboriginal dance floor; soil kept damp by aborigines who told us about crickets and dug them out using knives. Crickets a foot or so below surface; most burrows excavated yielded none. Burrows always several feet apart.

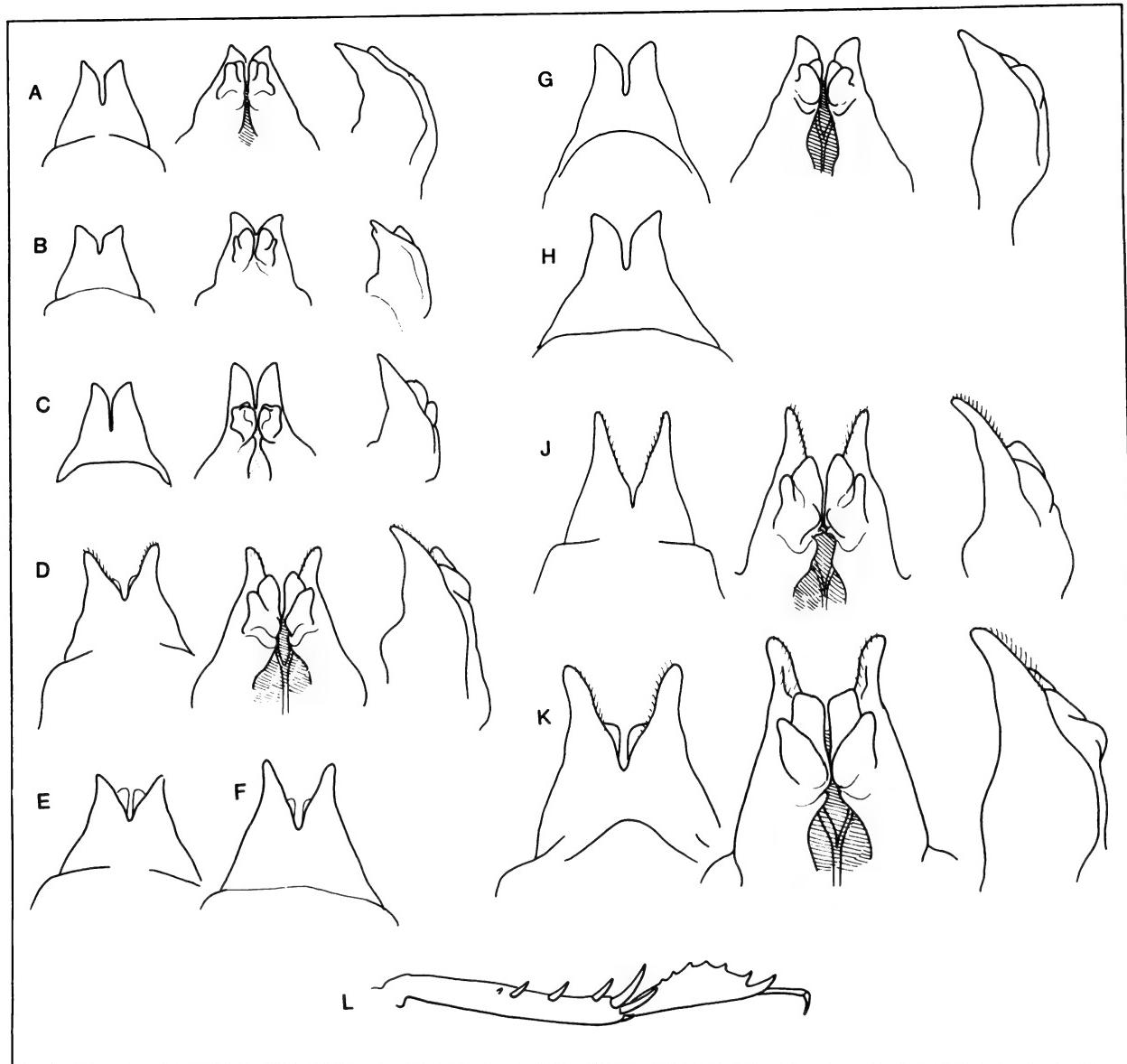


FIG. 35. *Apterogryllus*. A, *nyrang* holotype; B, *neonyrang* holotype; C, *paranyrang* holotype; D, *coorani* holotype; E, *coorani* Monteith field no. 20A; F, *coorani* Monteith field no. 77A; G, *midgee* holotype; H, *midgee* Monteith field no. 38A; J, *nanango* holotype; K, *kanandah* holotype; L, leg III of *yuraraba* holotype.

SPECIMENS. Holotype ♀ BM. A-115 2♂ 1♀ ANC. A-144 1♂ ANC. A-163 2♂ 5♀ ANC. NORTHERN TERRITORY: Smith Point, Cobourg Peninsula, 13 i to 20 ii 1967, 5♂ 1♀ ANC. Baroalba Ck. Springs, 19 km ENE of Mt. Cahill, 29 x 1972 (Key) 1j♀ ANC. Berrimah, i 1958 (Casey) 5♀ ANC. 15 km E Mt. Cahill, 8 iii 1973 (Key) 1♀ ANC. QUEENSLAND: Somerset, Cape York, 16-17 iv 1973 (Monteith) 2♀ uQ. Bamaga, 28 iii 1964 (Common, Upton) 1♀ ANC.

Apterogryllus rimbiae n. sp., Figs. 32H, 33G

RANGE. Type locality in Wessel Islands, NT.

RECOGNITION. Known only from one male. Body shape as in Fig. 32H. Top of body reddish-brown, side of body and legs very pale sandy brown. Genitalia generally similar to *A. pedestris* but differing

in several ways (Fig. 33G). Labial palpi as in *A. pedestris*. Pronotal disk and last two thoracic segments finely rugose. Top of body shiny and without pubescence. Tibia III with 5 inner and 6 outer subapical spurs. Basitarsus III with 4 inner and 5 outer dorsal spines. Head 0.96 times as wide as front of pronotum. Front of pronotum 1.14 times as wide as rear and 1.28 times the median pronotal length. Femur III 2.77 times as long as pronotum and 1.74 times as long as tibia III. Latter 2.21 times as long as basitarsus III. Body length ca. 27 mm; femur III ca. 19.5 mm; cerci ca. 14 mm.

HOLOTYPE. ♂, 11.01S 136.45E, Rimbija Island, Wessel Islands, NT, 13 i 1977 (Edwards) ANC.

HABITAT. Burrows in ground.

SPECIMENS. Holotype ♂ ANC.

Apterogryllus yirrkalis n. sp., Fig. 32D

RANGE. Extreme northern coastal Arnhem Land.

RECOGNITION. Males unknown. Body length 17–19 mm. Pronotum and abdomen velvety—covered with a fine pubescence. Ovipositor 2.7–2.8 times as long as pronotum. Tibia III with 5 inner and 4–5 outer subapical spurs. Last segment of labial palpi longer than last segment of maxillary palpi and with long setae (similar to *A. pedestris*, and *A. palpatus* but long setae not as dense). End of ovipositor as in Fig. 32D. Holotype measurements: Head 0.97 times as wide as front of pronotum. Front of pronotum 1.2 times as wide as back and 1.6 times as great as median length. Femur III 1.88 times as long as tibia III. Tibia III 1.79 times as long as basitarsus III. Tibia III with 5 inner and 5 outer subapical spurs. Basitarsus III with 6 outer and 5 inner spines dorsally. Body length 17 mm; femur III 11 mm; ovipositor 9.5 mm. Ovipositor 0.80 times as long as femur III and 2.8 times as long as pronotum (at middle).

HOLOTYPE. ♂, Yirrkala, 12.14S 136.56E, North Australia (L. Chaseling) ANC.

HABITAT. Burrows in ground.

SPECIMENS. Holotype ♂ ANC. Rimbija Island, Wessel Islands, NT, 4 ii 1977 (Weir) 1♀ ANC.

Apterogryllus bathurstis n. sp.

RANGE. Vicinity of Darwin and from Bathurst Island, NT.

RECOGNITION. Females: Large, red-brown to

blackish, shining cricket. Dorsum smooth, shining, very faintly and finely rugose along posterior margin of pronotum. Body length 35–40 mm. Ovipositor 3.7 to 3.8 times as long as pronotum. Labial palpi and galea with long hairs as in *A. palpatus* and *A. pedestris*. Apical spurs on tibia I slightly flattened. Holotype measurements: Head 1.02 times as wide as front of pronotum. Front of pronotum 1.14 times as wide as back and 1.27 times median pronotal length. Ovipositor 3.7 times as long as pronotum. Body length 39 mm; ovipositor 30 mm; abdomen length 25.5 mm; cerci ca. 20 mm.

HOLOTYPE. ♀, Bathurst Island, NT, x 1918 (G. F. Hill) SAM.

HABITAT. Burrows in ground.

SPECIMENS. Holotype ♀ SAM. Berrimah, NT, i 1958 (Casey) 1♀ ANC.

Apterogryllus alkina n. sp., Fig. 34A

RANGE. Coastal forest north of Bundaberg, QLD.

RECOGNITION. Medium brown to sandy colored. Dorsum of head usually somewhat darker brown. Dorsum of pronotum and abdomen velvety, covered with fine setae. Male genitalia as in Fig. 34A. Ovipositor 3.6–3.8 times as long as pronotum, slightly longer than femur III. Body length 21–28 mm (males), 24–28 mm (females); femur III 16.5–19 mm (males), 16–18 mm (females), ovipositor 16–19 mm; cerci 9–11 mm.

HOLOTYPE. ♂, Rainforest Pitfall 48B, Deepwater Creek, via Rosedale, QLD, 1975–1976, 10 m (G. B. and S. R. Monteith) QM.

HABITAT. Rain forest. All specimens collected in pitfall traps.

SPECIMENS. Holotype ♂ QM. Same data as holotype. 3♂ 3♀ 11j QM. Rainforest Pitfall 71, Rocky Point, 10 km S of Round Hill Head, QLD, 1976–1977, 60 m (G. B. and S. R. Monteith) 3♂ 1♀ QM.

BRUNNERIANUS GROUP

The last segment of the labial palpi is shorter than the last segment of the maxillary palpi and neither the labial palpi nor the galea have long fringes of setae. The apical spurs on tibia I are not strikingly flattened and sharpened along the edge.

Subgroup A

1. Body length 23–30 mm (♂), 22–30 mm (♀).
2. Femur III length at least 14 mm.

3. Ovipositor longer than femur III, at least 3 times as long as pronotum (at center).
4. Tibia III with subapical spurs beginning immediately adjacent to anterior proximal constriction (Fig. 32K); with 4–6 inner and 4–6 outer subapical spurs.
5. Tibia III without small spines above the subapical spurs.

Subgroup B

1. Body length 9–23 mm.
2. Femur III length less than 14 mm (except *ilga*).
3. Ovipositor shorter than femur III, from 0.2 to 1.5 times as long as pronotum (at center).
4. Tibia III with subapical spurs not located next to proximal constriction (Fig. 32L), with 3–5 inner and 3–5 outer subapical spurs.
5. Tibia III in some species with small spines above the spurs.

BRUNNERIANUS SUBGROUP A

brunnerianus

1. Male genitalia as in Fig. 33C.
2. Ovipositor 4.6–5.0 times as long as pronotum at center.

moomooma

1. Male genitalia as in Fig. 34C.
2. Ovipositor 3.6–3.8 times as long as pronotum at center.

durakai

1. Male genitalia as in Fig. 34B.
2. Ovipositor 4.4–5.1 times as long as pronotum at center.

ilga

1. Male genitalia not known.
2. Ovipositor 1.13 times as long as pronotum.

***Apterogryllus brunnerianus* Saussure, Figs. 29, 32CJKM, 33CD**

Apterogryllus brunnerianus Saussure 1877: 109. Lectotype ♀, here designated, Nord Austral. 3767, VM. Chopard 1951 synonymized this smaller eastern species under *A. pedestris* (Walker), but the type of *A. pedestris* has terminal segments with long hairs and in length longer than the last segment of the maxillary palpi.

RANGE. Southeastern QLD and eastern NSW.

RECOGNITION. Male genitalia as in Fig. 33CD. Top of head nearly black. Side of head pale, drop-shaped markings on disk of pronotum usually much lighter than surrounding regions. Top of abdomen brownish or blackish and sometimes banded. Ovipositor 4.6–5.0 times as long as the pronotum. Femur III from 1.73 to 1.93 times as long as tibia III. Tibia III with 5–6 inner and 4–6 outer subapical spurs. Body length of males 23–27 mm, of females 26–28 mm. Male from A-517 had following measurements: Head 1.10 times as wide as front of pronotum. Front of pronotum 1.15 times as wide as back. Femur III 1.93 times as long as tibia III. Tibia III 1.60 times as long as basitarsus III and with 5 inner (1 small) and 5 outer (1 small) subapical spurs.

Body length 23 mm; femur III length 13.5 mm; cerci ca. 8.5 mm. Female from A-517 had following measurements: Head 1.06 times as wide as front of pronotum. Front of pronotum 1.14 times as wide as back and 1.6 times length of pronotum. Femur III 1.88 times as long as tibia III and tibia III 1.86 times as long as basitarsus III. Ovipositor 1.23 times as long as femur III and 4.75 times as long as pronotum. Tibia III with 5 inner and 5 outer subapical spurs. Basitarsus III with 4–5 inner and 5–6 outer spines dorsally. Body length 26 mm; abdomen length 17 mm; femur III 14.5 mm; cerci ca. 9 mm; ovipositor ca. 17 mm.

HABITAT. At Cedar Creek several burrows had recently been worked slightly in soil lightly dampened by rain in grassy clearing in fairly dense but dry woodland. Male captured walking on surface at night and female dug up with shovel.

SPECIMENS. Lectotype ♀ VM. A-517 1♂ 1♀ ANC. 15 mi N of Bell, QLD, 27 x 1967 (White) 1♂ ANC. Eidsvold, QLD, 21 x 1929 1♂ ANC. Bald Mountain Area, via Emu Vale, SE QLD, 27 i 1972 (Monteith) 1♀ UQC. In nursery in SE QLD, 1942 (Bumblecombe) 1♀ BM. Auburn, Sydney, NSW, 12 v 1927, 1♀ BM.

***Apterogryllus moomooma* n. sp., Figs. 31, 34C**

RANGE. Type locality in southeastern coastal QLD where Monteith collected two males and four females in pitfall trap.

RECOGNITION. Indistinguishable from *A. brunnerianus* and *A. durakai* except by genitalia (Fig. 34C). Ovipositor 3.6–3.8 times as long as pronotum. Head and pronotum shiny. Body length 24–26 mm (males), 20–28 mm (females); femur III length 17–18 mm (males), 16.5–18 mm (females); ovipositor 16–17.5 mm.

HOLOTYPE. ♂, Rainforest Pitfall 47A, Eurimbula Creek, via Round Hill Head, QLD, 1975–1976, 5 m (G. B. and S. R. Monteith) QM.

HABITAT. Rain forest.

SPECIMENS. Holotype ♂ QM. Same data as holotype. 1♂ 4♀ QM.

***Apterogryllus durakai* n. sp., Fig. 34B**

RANGE. Southeastern QLD between Gympie and Brisbane.

RECOGNITION. Virtually indistinguishable from *A. brunnerianus* and *A. moomooma* except by male genitalia. Body length 25–30 mm (males), 22–30 mm (females); femur III length 16.5–20 mm (males), 15–

20.5 mm (females); ovipositor length 19–24 mm. Ovipositor 4.4 to 5.1 times as long as pronotum.

HOLOTYPE. ♂, Rainforest Pitfall 52B, Flinton Hill, via Ipswich, SE QLD, 1975–1976, 120 m (G. B. and S. R. Monteith) QM.

HABITAT. Rain forest.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 2♂ 6♀ QM.

DOUBTFUL DETERMINATIONS. Rainforest Pitfall 2, Little Yabba Ck, via Kenilworth, SE QLD, 1974–1975, 152 m (Monteith) 1♀ QM. Rainforest Pitfall 6, Cooran Plateau, via Traveston, SE QLD, 1974–1975, 366 m (Monteith) 1♀ QM.

Apterogryllus ilga n. sp.

RANGE. Type locality near Mt. Garnet, QLD.

RECOGNITION. Female: Female ovipositor only slightly longer than pronotum. Face reddish. Top of head dark brown. Tibia III with 5 inner and 5 outer subapical spurs and basitarsus III with 4 inner and 6 outer spines dorsally. Occiput and posterior parts of cheeks with covering of fine short hairs. Last segment of labial palpi as in *A. brunnerianus*. Head 1.03 times as wide as front of pronotum. Front of pronotum 1.21 times as wide as back. Femur III 1.82 times as long as tibia III. Tibia III 1.89 times as long as basitarsus III. Ovipositor 0.29 times as long as femur III and 1.13 times as long as pronotum. Body length 23 mm; femur III length 17 mm; cerci 11 mm.

HOLOTYPE. ♀, "40 mile scrub," 40 miles west of Mt. Garnet, QLD, 31 v 1972 (G. B. and S. R. Monteith) UQC.

SPECIMENS. Holotype ♀ UQC.

BRUNNERIANUS SUBGROUP B

bimblios

1. Body length 17–19 mm (♂) (females unknown). Femur III length 12.5–13.5 mm.
2. Male head about as wide as front of pronotum.
3. Pronotum and abdomen velvety, not shiny.
4. Tibia III with 3 inner and 3 outer subapical spurs and with 1–3 inner and 2–4 outer small spines above the apical spurs.
5. Dorsum of abdomen distinctly lighter medially than laterally.
6. Ovipositor not known.

kanandah

1. Body length 18–24 mm (♂), ca. 21 mm (♀). Femur III length 12.5–13.5 mm.
2. Male head wider than front of pronotum.
3. Pronotum shiny.
4. Tibia III with 4–5 inner and 4–5 outer subapical spurs and with 0 or 1 small spine above subapical spurs.

5. Dorsum of abdomen unicolorous dark brown.

6. Ovipositor ca. 1.2 times as long as pronotum at center. *coorani*

1. Body length 15–17 mm (♂); ca. 16 mm (♀). Femur III length 9–11 mm (♂, ♀).
2. Male head distinctly wider than front of pronotum.
3. Pronotum shiny.
4. Tibia III with 3–4 inner and 3–4 outer subapical spurs and with 0–3 small spines above subapical spurs.
5. Dorsum of abdomen unicolorous very dark brown or blackish.
6. Ovipositor less than 0.3 times as long as pronotum. *midgee*

1. Body length 14–16 mm (♂); females unknown. Femur III length 9–10 mm.
2. Male head distinctly wider than front of pronotum.
3. Pronotum shiny.
4. Tibia III usually with 3 inner and 3 outer subapical spurs and with 1–4 small spines above spurs.
5. Dorsum of abdomen as in *coorani*.
6. Ovipositor length not known.

nanango

1. Body length 15–16 mm (♂); 15–17 mm (♀). Femur III length 8.5–9.5 mm.
2. Male head not distinctly wider than front of pronotum.
3. Pronotum shiny.
4. Tibia III with 4 inner and 4 outer subapical spurs and usually without small spines above spurs.
5. Dorsum of abdomen as in *coorani*.
6. Ovipositor 1.3–1.5 times as long as pronotum.

yuraraba

1. Body length 13 mm (♀) (males unknown). Femur III length ca. 10 mm.
 2. Male head not known.
 3. Pronotum slightly velvety, somewhat shiny.
 4. Tibia III with 3 inner and 3 outer subapical spurs and with 1 inner and 3–4 outer small spines above spurs.
 5. Dorsum of abdomen as in *coorani*.
 6. Ovipositor minute; less than 0.2 times as long as pronotum.
- Unique feature:* basal segment of tarsus III laterally flattened and expanded (Fig. 35L).

Nyrang Infragroup

1. Body length less than 12 mm; femur III length less than 9 mm.
2. Male head about as wide as front of pronotum.
3. Pronotum shiny.
4. Tibia III with 3 inner and 3 outer subapical spurs and with 1–4 inner and 2–5 outer small spines above the spurs.
5. Dorsum of abdomen blackish.
6. Ovipositor not known.

Apterogryllus bimblios n. sp., Figs. 32L, 33E

RANGE. Southeastern QLD.

RECOGNITION. Males: Body length 17.5 mm. Genitalia as in Fig. 33E. Labial palpi not greatly enlarged (similar to *A. brunnerianus*). Tibia III with 3 inner and 3 outer subapical spurs and with 2–3

small outer spines proximal to spurs (Fig. 32L). Basitarsus III with 7 inner and outer spines dorsally. Head 1.02 times as wide as front of pronotum. Front of pronotum 1.17 times as wide as back and 1.54 times the median pronotal length. Femur III 1.66 times as long as tibia III. Latter 2.0 times as long as basitarsus III. Body length ca. 17.5 mm; femur III length ca. 19 mm; cerci ca. 7 mm.

HOLOTYPE. ♂, Mt. Glorious, near Brisbane, QLD, 610 m, at light, 8 iv 1978 (Rentz and Rentz) ANC.

HABITAT. Rain forests.

SPECIMENS. Holotype ♂ ANC. Rainforest Pitfall 45B, Mt. Tenison Woods, via Mt. Glorious, SE QLD, 1975–1976, 762 m (Monteith) 1♂ QM.

***Apterogryllus kanandah* n. sp., Fig. 35K**

RANGE. Type locality in southeastern QLD.

RECOGNITION. Very similar to *A. coorani*, but larger, male genitalia slightly different, ovipositor about as long as pronotum, tibia III usually without small spines above the subapical spurs. Body length 15–17 mm (males), ca. 16 mm (female); femur III length 12.5–13.5 mm; ovipositor 1.25 times as long as pronotum at center; cerci 7–9 mm. Dorsum of body almost unicolorous dark brown, dorsum of head not noticeably lighter in color than dorsum of abdomen.

HOLOTYPE. ♂, Rainforest Pitfall 6, Cooran Plateau, via Traveston, SE QLD, 1974–1975, 366 m (G. B. and S. R. Monteith) QM.

HABITAT. Rain forest. All six specimens collected in pitfall traps by the Monteiths.

SPECIMENS. Holotype ♂ QM. Same data as holotype. 4♂ 1♀ QM.

***Apterogryllus yuraraba* n. sp., Fig. 35L**

RANGE. Type locality in southeastern QLD.

RECOGNITION. Female: The only existing female appears to be an adult, but may not be. Unique in having laterally compressed basal tarsal segment on leg III (Fig. 35L). Ovipositor just extends beyond subgenital plate. Body length 13 mm; femur III length ca. 10 mm; cercal length ca. 5.2 mm.

HOLOTYPE. ♀, Rainforest Pitfall 32, Granite Creek, Bulburin, via Miriamvale, SE QLD, 1974–1975, 213 m (G. B. and S. R. Monteith) QM.

HABITAT. Rain forest.

SPECIMENS. Holotype ♀ QM.

***Apterogryllus coorani* n. sp., Fig. 35DEF**

RANGE. Rain forests of southeast QLD.

RECOGNITION. Male genitalia as in Fig. 35DEF. Head usually reddish, pronotum same color as head or darker; abdomen usually dark brown to black on dorsum. Pronotal disk shiny or with a dull finish. Ovipositor very short, barely emerging from subgenital plate, less than 0.3 times as long as pronotum. Tibiae III usually with 1–4 inner and outer small spines above spurs. Male head bulbous, wider than widest part of pronotum. Body length 15–17 mm (males) ca. 16 mm (females); femur III length 9–11 mm (males), ca. 10.5 mm (females).

HOLOTYPE. ♂, Rainforest Pitfall 11A, Gallangowan, SE QLD, 1974–1975, 487 m (G. B. and S. R. Monteith) QM.

HABITAT. Rain forest. All specimens caught in pitfall traps by the Monteiths.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 3♂ QM. Rainforest Pitfall 6B, Cooran Plateau, via Traveston, SE QLD, 1974–1975, 366 m (Monteith) 1♂ QM. Rainforest Pitfall 16, top of Blackbutt Range, via Benarkin, SE QLD, 1974–1975, 396 m (Monteith) 4♂ QM. Rainforest Pitfall 20, Bald Mountain, via Emu Vale, SE QLD, 1974–1975, 1127 m (Monteith) 2♂ QM. Rainforest Pitfall 21, Plateau S of "The Head," via Killarney, SE QLD, 1974–1975, 1066 m (Monteith) 4♂ QM. Rainforest Pitfall 49, Mt. Clunie, via Woodenbong, NSW, 1975–1976, 670 m (Monteith) 1♂ QM. Rainforest Pitfall 73, Burnett Range, 15 km NE of Tansley, QLD, 1976–1977, 400 m (Monteith) 1♂ QM. Rainforest Pitfall 74, Mistake Mountains (north), via Goomburra, QLD, 1976–1977, 975 m (Monteith) 1♂ QM. Rainforest Pitfall 76, Mistake Mountains (south) via Goomburra, QLD, 1976–1977, 1040 m (Monteith) 3♂ QM. Rainforest Pitfall 77, Elginvale, 30 km NE Nanango, QLD, 1976–1977, 610 m (Monteith) 3♂ 1♀ QM.

***Apterogryllus midgee* n. sp., Fig. 35GH**

RANGE. Southeastern QLD between Bunya Mountains and Ravensbourne National Park, near Toowoomba.

RECOGNITION. Females not known. Very similar to *A. coorani*, sharing with that species a large reddish head, but male genitalia different, and tibia III usually with 3 inner and 3 outer subapical spurs. Body length 14–16 mm (males); femur III length 9–10 mm; cerci 4.0–5.5 mm.

HOLOTYPE. ♂, Rainforest Pitfall 19, Bunya Mts, SE QLD, 1974–1975, 1006 m (G. B. and S. R. Monteith) QM.

HABITAT. Rain forest. All specimens collected by the Monteiths in pitfall traps.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 4♂ QM.

Rainforest Pitfall 38, Ravensbourne National Park, via Toowoomba, SE QLD, 1974–1975, 731 m (Monteith) 5♂ 2j QM.

Apterogryllus nanango n. sp., Fig. 35J

RANGE. Southeastern QLD, vicinity of Nanango and Yarraman.

RECOGNITION. Very similar to *A. coorani* but head of male not broader than pronotum and not reddish as in that species. Differing also in male genitalia. Female ovipositor 1.3–1.5 times as long as pronotum. Tibia III usually without small spines above spurs. Body length 15–16 mm (males), 15–17 mm (females); femur III length 8.5–9.5 mm; cerci 4–5 mm.

HOLOTYPE. ♂, Rainforest Pitfall 62, Archoo-koora, via Nanango, SE QLD, 1975–1976, 580 m (G. B. and S. R. Monteith) QM.

HABITAT. Rain forest. The Monteiths collected all specimens in pitfall traps.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 1♂ 2♀ QM. Rainforest Pitfall 17, 3 km E Yarraman, SE QLD, 1974–1975, 518 m (Monteith) 1♂ 2♀ QM.

Apterogryllus ny rang n. sp., Fig. 35A

RANGE. Type locality near Maidenwell southeast QLD.

RECOGNITION. Males: Most similar to *A. paranyrang* and *A. neonyrang* but also similar to *A. midgee*, *A. coorani*, and *A. nanango*. Very small (male body length 9–10 mm, femur III length ca. 7 mm). Head black on dorsum. Genitalia as in Fig. 35A. Tibia III with 3 inner and 3 outer subapical spurs and 1–2 inner and 2–4 outer small spines above spurs. Cerci 2.5–3.5 mm.

Female not known.

HOLOTYPE. ♂, Rainforest Pitfall 18A, Upper Yarraman SF, via Maidenwell, SE QLD, 1974–1975, 610 m (G. B. and S. R. Monteith) QM.

HABITAT. All four specimens collected in rainforest pitfall trap.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 2♂ 1j QM.

Apterogryllus paranyrang n. sp., Fig. 35C

RANGE. Type locality in the Bunya Mountains, SE QLD.

RECOGNITION. Males: Very similar to *A. ny rang* but differing in male genitalia (Fig. 35C). Body length 10–11.5 mm; femur III length 6–7 mm; cerci 2.5–3.5 mm.

HOLOTYPE. ♂, Rainforest Pitfall 44A, Saddletree Creek, Bunya Mountains, SE QLD, 1975–1976, 640 m (G. B. and S. R. Monteith) QM.

HABITAT. All eight specimens captured in rainforest pitfall traps.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 3♂ 4j QM.

Apterogryllus neonyrang n. sp., Fig. 35B

RANGE. Type locality near Biggenden, southeast QLD.

RECOGNITION. Males: Most similar to *A. paranyrang* and *A. ny rang*. Very small body length of holotype about 8 mm; femur III length ca. 6 mm; cerci ca. 3 mm. Male genitalia as in Fig. 35B. Tibia III with 3 inner and 3 outer subapical spurs and 3–4 inner and 3–5 outer small spines above spurs.

HOLOTYPE. ♂, Rainforest Pitfall 72B, Coulston Lakes, 26 km SW of Biggenden, QLD, 1976–1977, 275 m (G. B. and S. R. Monteith) QM.

HABITAT. Both specimens caught in rainforest pitfall trap.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 1♂ QM.

TRIBE GRYLLINI

Of the Australian genera we have placed only *Teleogryllus* in the tribe Gryllini. The tribe is poorly defined; we have adopted the expedient of defining the other tribes of Gryllinae and what remains is placed under Gryllini (see Table 1).

Genus *TELEOGRYLLUS* Chopard

Teleogryllus Chopard 1961: 277. Type species: *Gryllus posticus* Walker 1868: 30, by original designation.

This genus contains three species of large field crickets, two commonly associated with damage to range grasses in southern Australia (*T. commodus*) and with sugarcane fields and lawns in northern Australia (*T. oceanicus*). The 32 previously known species (Chopard 1967) are widespread in Asia and Africa. *T. oceanicus* occurs throughout the Pacific Islands while *T. commodus* is evidently restricted to Australia. *Teleogryllus* species are apparently all alike in possessing a complex song containing two alternated trills with different pulse rates; we have taped songs of two African species as well as the three Australian species.

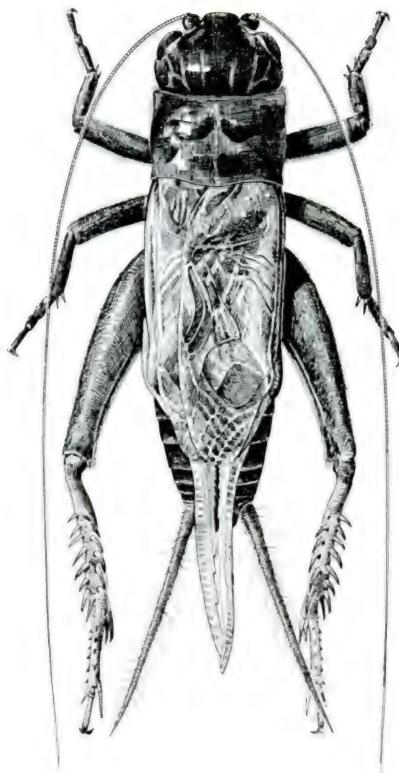


FIG. 36. *Teleogryllus commodus*.

These Australian field crickets live on the soil surface, usually inhabiting fissures or shallow, simple burrows, particularly under stones or clods. Many or most males seem not to be occupying excavated burrows, though they may be in or near slightly modified crevices. They sing almost entirely at night, also less frequently and in smaller numbers on cloudy, cool afternoons, when individual males may intermittently produce only the slower, single-pulse series or court females. In locales where the nights are frequently too cool for singing, as in Tasmania in this study, males may sing principally in the daytime as with some North American *Gryllus* species (Alexander and Meral 1967).

All Australian species are restricted to grassy or weedy areas, and dense populations seem to occur only where considerable cover is found, such as matted dead herbiage, or where soil fissures are numerous and deep.

Recent work on the biology, physiology, cytology and morphology of two species has been ex-

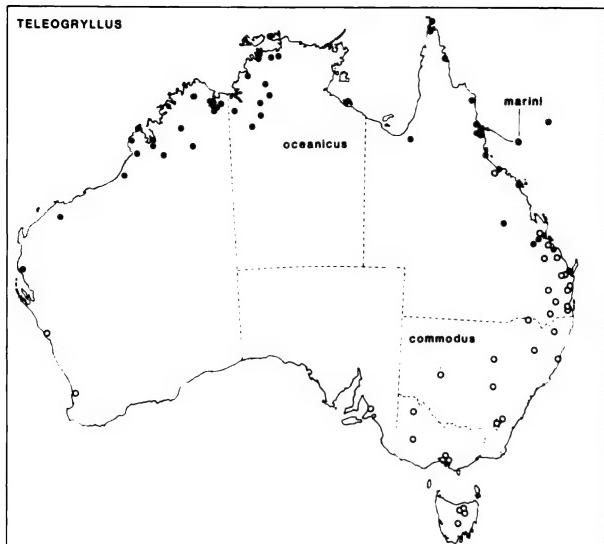
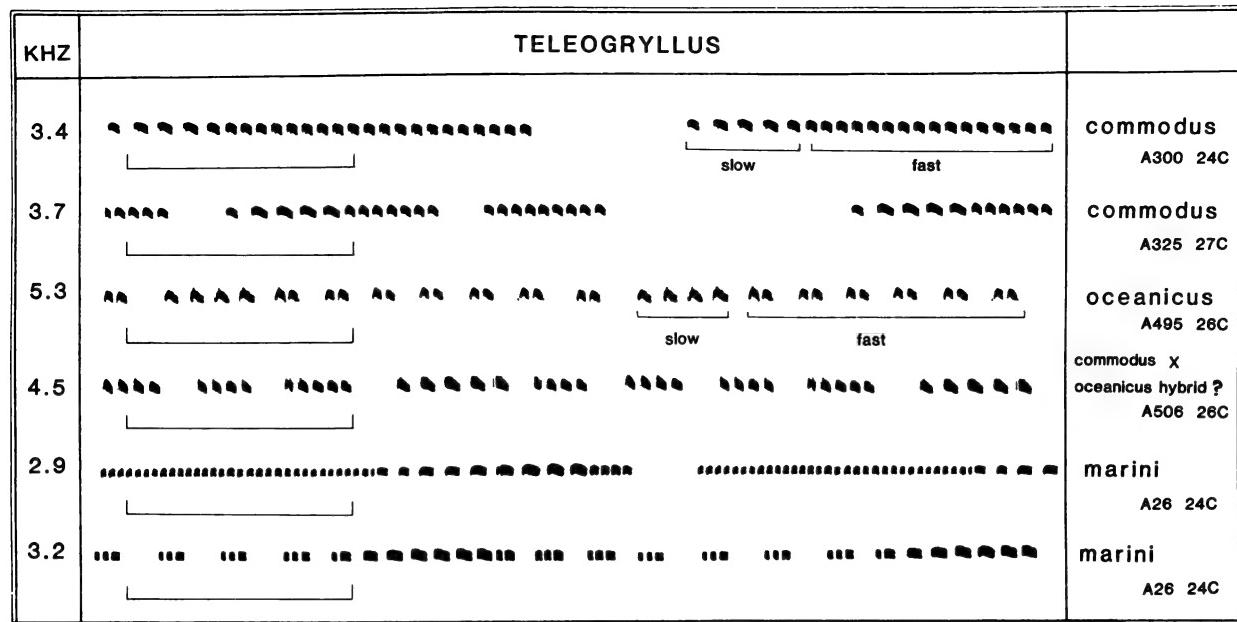


FIG. 37. *Teleogryllus* distributions.

tensive. Hill et al. (1972) list references and summarize results. It is only necessary here to repeat that the two species are distinct, overlap geographically and show no evidence of character displacement in song attributes in the zone of overlap. *T. commodus* is a univoltine, egg-diapausing species, *T. oceanicus* a more or less continuously breeding tropical species.

RECOGNITION. Large blackish and dark brown crickets. Male body length to end of HW's 28–35 mm; female body length to end of ovipositor 33–42 mm. Head and pronotum often black; face, legs, and FW's varying from dark brown to medium brown. All individuals with longitudinal stripes on back of head; in brownish specimens 6 longitudinal stripes present on occiput; in very dark individuals only four stripes visible, two emerging from posterior-medial margin of each eye. Front of head without broad pale stripe connecting lateral ocelli. Tibia I with auditory tympana on inner and outer faces; inner one small and roundish, other one very large and elongated. HW's extending well beyond ends of FW and end of abdomen. FW's always with well-developed apical area; mirror divided by one vein; harp with 3 or 4 veins. Tibia III with 6 inner subapical spurs (incl. i-4) and 6 (rarely 7) outer subapical spurs (incl. o-4). Female ovipositor 1.25–1.62 times as long as femur III.

FIG. 38. *Teleogryllus* songs. Scale = 0.5 s.

The Australian species are very similar and cannot be separated by male genitalia. The ranges of the most similar species overlap slightly or not at all, so identification is usually not difficult. Males can be separated by geography and file tooth counts; females are more difficult.

T. commodus

1. File with 180–200 teeth.
2. Ovipositor 1.39–1.62 times as long as femur III.
3. Harp with 3 and very often with 4 veins.
4. Song as in Fig. 38.

T. oceanicus

1. File with 225–278 teeth.
2. Ovipositor 1.25–1.46 times as long as femur III.
3. Harp with 3 veins.
4. Song as in Fig. 38.

T. marini

1. File with 177–191 teeth.
2. Ovipositor 1.28 times as long as femur III.
3. Harp with 3–4 veins.
4. Song as in Fig. 38.

Teleogryllus commodus (Walker), Figs. 36, 39A

Gryllus commodus Walker 1869: 45. Neotype ♂ here designated. Walker's female type from WA deposited in Saunders Collection is evidently lost. The macropterous female with wings spread, sent to us by the Hope Museum at Oxford, does not appear to us to be the type. It was recently labelled as the

type but it bears the label, "Australia" and not "Western Australia," as it should.

Gryllus fuliginosus Serville 1839: 34. Location of type not known. Synonymized by Chopard 1951: 410.

Gryllus servillei Saussure 1877: 156. Synonymized by Chopard 1951: 410.

Gryllus carbonarius Serville 1839: 34. Synonymized by Chopard 1951: 410.

RANGE. Southern Australia and eastern Australia to southern QLD, and Norfolk Island.

RECOGNITION. Males: Largely indistinguishable from *T. oceanicus* but file with fewer file teeth (neotype has 195 teeth; 6 other males have 183–195 teeth). Male genitalia as in Fig. 39A. Body length to end of FW's 28–35 mm; femur III length 11.6–13.5 mm; FW length 12–15.5 mm; cercal length 10–12 mm.

Females: Mostly indistinguishable from *T. oceanicus* but ovipositor slightly longer—between 1.39 and 1.62 times as long as femur III. Body length to end of HW 29–35 mm; femur III length 11.5–13 mm.

NEOTYPE. ♂, A-655, Medina, WA, 21 iv 1969, ANC.

SONG. Fig. 38. Alternation of two trills. Slower trill short, and faster trill longer and sometimes bro-

ken into several short trills before slow-pulse trill is repeated. Whole phrase repeated about 3 times every 10 seconds during steady singing.

In Tasmania, it sang almost entirely in daytime, apparently because nights were so cold. We also heard it singing in the afternoon near Mildura.

Song generally similar to that of *T. marini* but difference in pulse rates between the two trills much greater in *T. marini*. In *T. commodus* the slower pulse rate divided by the higher gives the following values at the different localities: 0.55 (A-2), 0.59–0.61 (A-3), 0.43 (A-5), 0.62 (A-300), 0.56 (A-325), 0.56 (A-528), 0.65 (A-538), 0.56 (A-549), 0.70 (A-725), 0.59 (A-726).

	slow trill		fast trill		kps	°C
	p/s	p/tr	p/s	p/tr		
A-2	9	5	16.4	7–12	3.5	18
A-3	12.4	4–5	20.4	10–13	3.8	18
A-3	12.2	5	20.6	9–18	3.8	18
A-5	9.7	5–6	22.4	14–18	4.6	19
A-300	17.6	5	28.6	20	3.4	24
A-310	18.8–19.4	19	—	—	2.9	16
A-325	18.2	5	32.5	7–9	3.7	27
A-528	14.5	4	26.1	19	3.8	18
A-536	—	—	20.3	14	3.2	19
A-538	17.6	5	27.2	19–28	3.4–3.7	24
A-549	15.3	5	27.2	9	3.8	22
A-725	14.2	8	20.3	19	3.6	14
A-726	21.2	5–6	36.0	8–11	3.9	21
A-733	10.8	14	—	—	3.4	16
A-735	—	—	27	8	3.8	18

HABITAT. Open grassy country and pastures, in drier country near washes and at the margins of marshes, ponds, rivers. Usually only abundant where soil cracks occur. Adults probably fly, though no one has reported seeing them fly. Macropterous individuals frequently near lights in downtown Melbourne on concrete with no grass for several blocks.

SPECIMENS. Neotype ♂ ANC. A-305 4♂ ANC. A-335 1♂ ANC. A-733 1♂ ANC. WESTERN AUSTRALIA: Geraldton, Chapman River, 6 i 1966 (J. A. Grant) 1♂ BM. SOUTH AUSTRALIA: Adelaide, Reared Lab Culture, MacDonald College, Canada, 1960. 1♂ 1♀ ANC. NEW SOUTH WALES: Sheppard's Paddock, Bungendore, 8 v 1900 (Gay) 1♀ ANC. Uralla, 26 iii 1954 (Riek) 1♂ ANC. VICTORIA: Dunkeld, 20 iii 1922 (Bodley) 1♀ ANC. Dunkeld, 7 ii 1922 (Bodley) 1♀ ANC. Reared Lab Culture, MacDonald College, Canada, i 1960, 1♂ ANC. Reared Lab Culture, MacDonald College, Canada, ii 1960, 1♀ ANC. Mallee 1 m S of Ouyen, 16 iii 1966 (Grant) 1♂ 1♀ BM. ACT: Black Moun-

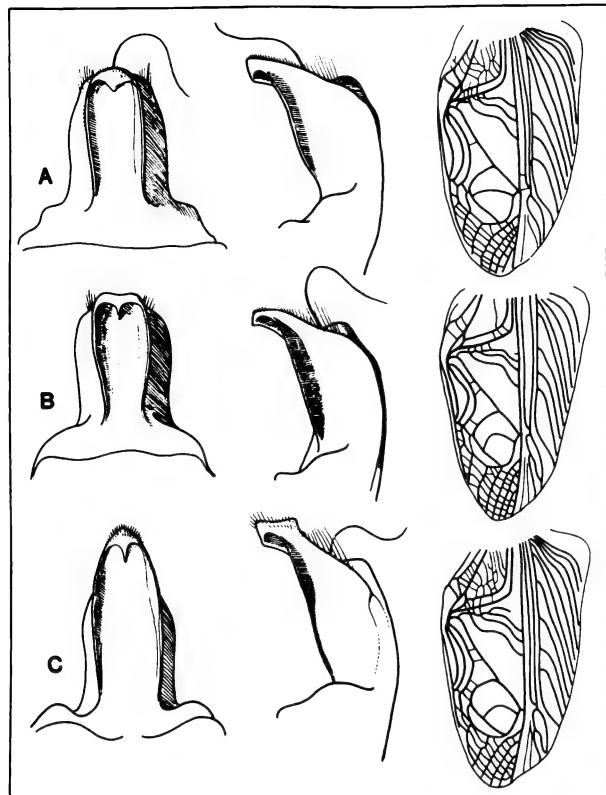


FIG. 39. *Teleogryllus*. A, *commodus* genitalia (dorsal and lateral) and neotype FW; B, *oceanicus* genitalia (Kuranda QLD) and FW; C, *marini* genitalia and FW.

tain, 10 i 1966, 2♂ 3♀; 11 i 1966, 1♂; 23 ii 1966, 1♂ 1♀; 22 ii 1965, 1♀; 9 iv 1969, 1♂; 30 i 1966, 1♀; 30 xii 1965, 1♀; 7 ii 1969, 1♂; 9 iii 1969, 1♀; 12 xii 1967, 1♀; 11 iii 1966, 1♀; 21 ii 1969, 1♂; 16 i 1969, 1♂ 1♀; 26 i 1966, 3♂ 2♀; Mt. Ainslie, 10 i 1966 (Upton) 1♂ 1♀ ANC. Canberra, 30 i 1951 (Carne) 1♂ ANC. Canberra (Kambah), 1 iv 1979 (Rentz) 2♂ ANC.

Teleogryllus oceanicus (Le Guillou), Fig. 39B

Gryllus oceanicus Le Guillou 1841: 293. L. Chopard informed us that the type is lost. Neotype ♂, A-55, Townsville, QLD, 28 viii 1968 (Alexander, Otte) ANC, here designated. Transferred to *Teleogryllus* by Chopard 1951.

Gryllus innotabilis Walker 1869: 47. Lectotype ♀, here designated, Zoo Choo (Capt. Beechey) BM. Synonymized by Chopard 1951: 410. Type examined.

RANGE. Chopard (1951) considered *T. oceanicus* to be an "insular race" of *T. commodus* and believed it to be uncommon in Australia but widespread in Oceania. It is indeed widespread in Oceania and extends all the way to Hawaii, but it ranges across northern Australia where it inhabits

permanent water courses and may be found associated with temporary ponds.

RECOGNITION. Males: *T. oceanicus* virtually indistinguishable from *T. commodus* by external morphology. Males however have larger number of file teeth (225–278; n=40+) (neotype has 252 teeth), and they always have 3 harp veins, whereas *T. commodus* has 3 or 4 veins. Body length to end of HW 29–34 mm; FW length 12.5–16 mm; femur III length 9.5–13 mm; cercal length 10.5–11 mm.

Females: Very much like *T. commodus*, but ovipositor averaging slightly shorter—1.25–1.46 times as long as femur III (n=6). Body length to end of HW 30–36 mm; FW length 12–14.5 mm; femur III length 10.5–13.5 mm; ovipositor length 15.5–19 mm.

SONG. Fig. 38. Alternation of short, 3–6 pulse trill followed by series of 2–4 pulse chirps. Whole phrase repeated 3 to 5 times every 10 seconds. Song varies somewhat from place to place as can be seen from table below.

	trill		chirps			ch/ phrase	kps	°C
	p/s	p/tr	p/s	ch/s	p/ch			
A-3	10.2	5	16.7	4.6	2		4.5	18
A-4	14.3	4	25.0		2	7	4.5	22
A-5	10–10.8	4	19.0	4.5	2	5	4.4	17
A-26	12.0	5–6	25.0	4.4	2–3		2.9	22
A-27	14.5	5	23.2		2–4		3.0	21
A-28	12.3	5	20.0	5.6	2–3		4.6	18
A-30	12.3–13.6	5	22.0	5	2–3		4.5	22
A-30	13.3	6	26.5	5	3–5		2.9	22
A-36	14.0	4	22.0	6.3	2–3		4.5	24
A-130	18.1	4	30.3	9.4	2	6	5.2	27
A-130	18.0	3–4	30.3	8.8	2	8	5.2	27
A-130	16.0	3	26.3	8.6	2	8	5.4	27
A-137	17.6	3	25.0	7.1	2		5.4	28
A-141	16.0	4	29.2	6.0	2		4.8	22
A-166	14.4	6	46.7	5.6	2		4.6	29
A-172	15.2	3	25.0	7.2	2–3		5.0	24
A-258	15.0	4	45.5	8.0	2		4.8	24
A-286	18.4	3	27.6	7.7	3		5.0	24–27
A-495	17.4	4	33.3	9.1	2		5.3	26
A-506	18.0	3	28.6	4.2	2		5.3	26
A-506	18.0	5	28.6	9.0	4		4.5	26
A-774	16.4	4	50.0	7.2	2	4–8	4.7	25
A-782	15.4	4	45.5	7.5	2		4.6	23
A-782	15.1	4	44.0	8.0	2		5.1	23
Fiji	17.0	3–4	23.8	8.8	2		3.45	

HABITAT. Grassy clearings, roadsides, lawns, and near marshy areas across northern Australia. Does not live in burrows.

SPECIMENS. Neotype ♂ ANC. A-3 1♂ ANC. A-10 1♀ ANC. A-27 3♂ ANC. A-36 3♀ ANC. A-55 3♂ 3♀ ANC. A-130 1♂ ANC. A-135 3♂ ANC. A-139 1♂ ANC. A-179 1♂ 1♀ ANC. A-180 1♀ ANC. A-506 3♂ ANC. A-782 3♂ ANC. A-857 1♀ ANC. WESTERN AUSTRALIA: 19.19S 122.10E, 8 km S of Cape Bertholet, West Kimberley, 17 iv 1977 (Colless) 1♂ ANC. Myrooda Crossing, Fitzroy R, 28 v–6 vi 1951 (Guppy) 2♀ ANC. Langey's Crossing, 26 m S of Derby, 15 iv 1963 (Chinnick) 3♂ 1♀ ANC. Kimberley Res. Station, 24 i 1961 (Richards) 1♀ ANC. 8 m S of Lansdowne HS, 1 ix 1964 (Plumb) 1♀ ANC. Cape Levesque, 11–12 vi 1966 (Skwarko) 1♀ ANC. Windham-K.R.S., 8 xii 1933 (Lukens) 1♂ ANC. Forrest R, Cambridge Gulf, 18 xii 1929 (Campbell) 1♂ ANC. 9 mi SSE of Gordon Downs HS, 13 iv 1963 (Chinnick) 1♀ ANC. 25 m ESE of Broome, 16 iv 1963 (Chinnick) 1♀ ANC. 17.17S 122.10E, 5 km SW of Cape Bertholet, West Kimberley dist, 21 iv 1977 (Colless) 1♀ ANC. 14.39S 126.57E, Drysdale R, Kimberley dist, 18–21 viii 1975 (Common, Upton) 1♂ ANC. 15.02S 126.55E, Drysdale R, Kimberley dist, 3–8 viii 1975 (Common, Upton) 2♀ ANC. 14.49S 126.49E, Carson Escarpment, Kimberley dist, 9–15 viii 1975 (Common, Upton) 1♂ 2♀ ANC. 15.19S 126.32E, Old Doongan, Kimberley dist, 2 viii 1975 (Common, Upton) 1♀ ANC. 24.49S 113.46E, Gascoyne R, 13 km NE by E of Carnavon, 29 iii 1971 (Upton, Mitchell) 1♀ ANC. 16.34S 122.51E, Martins Well, West Kimberley dist, 24 iv 1977 (Colless) 1♀ ANC. 21.35S 117.04E, 1 km N of Millstream HS, 28 x 1970 (Upton, Feehan) 1♂ ANC. 21.35S 117.04E, 1 km NE of Millstream HS, 8 iv 1971 (Upton, Mitchell) 1♀ ANC. 21.37S 117.06E, 5 km SE of Millstream HS, 12 iv 1971 (Upton, Mitchell) 1♀ ANC. 21.34S 117.03E, 3 km NW by W of Millstream HS, 5 iv 1971 (Upton, Mitchell) 1♂ ANC. 21.34S 117.03E, 3 km NW by W of Millstream HS, 22 iv 1971 (Key, Upton, Mitchell) 1♀ ANC. 21.35S 117.04E, Millstream HS, 24 iv 1971 (Key, Upton, Mitchell) 1♀ ANC. 21.35S 117.04E, 0.5 km WNW of Millstream HS, 14 iv 1971 (Upton, Mitchell) 1♂ ANC. 21.35S 117.04E, 5 km W of Millstream HS, 21 iv 1971 (Key, Upton, Mitchell) 1♀ ANC. 21.35S 117.04E, 0.5 km W of Millstream HS, 5 xi 1970 (Upton, Feehan) 1♀ ANC. NORTHERN TERRITORY: Horn Islet, Sir Edward Pellew Group, 25–31 i 1968 (Cantrell) 1♂ uqc. Darwin, 6–9 xii 1963 (Sedlacek) 1♂ BISH. Darwin, 1–7 i 1964 (Sedlacek) 1♀ BISH. 12.12S 136.47E, Nhulambuy, 18 v 1975 (Key, Balderson, Freeman) 1♀ ANC. 16.24S 131.02E, 2 mi ENE of Vict. R Downs HS, 15 vi 1969 (Mendum) 1♂ ANC. 16.49S 130.28E, 13 mi NNW of Mt. Sanford HS, 19 vi 1969 (Ashworth) 1♂ BISH. Daly River Miss, 26 viii 1974 (Hutchinson) 5♀ ANC. Daly River Miss, 17 viii 1974 (Hutchinson) 2♀ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 28 i 1977 (Bakker) 1♂ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 15–17 ii 1977 (Weir) 1♀ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 3 ii 1977 (Lewis) 1♀ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 16 ii 1977 (Lewis) 1♀ ANC. 14.13S 130.55E, 34 mi NW by W of Dorisvale HS, 11 ix 1968 (Clarke) 1♂ ANC. 15.34S 130.54E, 4 mi W by S of Coolibah HS, 13 vi 1968 (Mendum) 1♂ ANC. 15.34S 130.54E, 4 mi W by S of Coolibah HS, 17 vi 1968 (Mendum) 1♀ ANC. 14.11S 130.08E, 47 mi SW by W of Daly River Miss, 28 viii 1968 (Mendum) 1♀ ANC. 15.32S 130.50E, 9 mi W by N of Coolibah HS, 22 v 1968 (Mendum) 1♀ ANC. QUEENSLAND: Willis Is., 13–14 v 1978. 1♀ ANC. Bamaga, Cape York, 3–6 vi 1969 (Monteith) 2♀ UQC. Cairns, 1920 (Illingworth) 1♀ BISH. Cullareng, iv 1909 (Helms Collection) 1♀ BISH. Kuranda, 200 m, 13 iii 1956 (Gres-

TABLE 4. Condition of the auditory tympana in certain Landrevini.

Genus	Inner	Outer	Stridulum	Mirror
<i>Mjöbergella</i> ♂	+	-	+	+, -
♀	±	-		
<i>Copholandrevus</i> ♂	-	-	-	-
♀	-	-		
<i>Landreva</i>	-	+	+	±
<i>Duolandrevus</i>	+	+	+	
<i>Endolandrevus</i>	+	-	+	-
<i>Hemilandreva</i>	-	+	-	-
<i>Odontogryllodes</i>	-	-	-	-
<i>Paralandrevus</i>	+	+	+	+?
<i>Gryllitara</i>	+ (slit)	+	+	+

sitt) 1♂ ANC. Halifax, iv 1920 (Muir) 1♀ BISH. Booby Island, 12–13 iii 1978. 1♂ ANC. Iron Range, 16 x 1976 (Holm) 1♂ ANC.

Teleogryllus marini n. sp., Fig. 39C

RANGE. Type locality in vicinity of Bramston Beach, near Innisfail, QLD.

RECOGNITION. Males: Body color dark reddish-brown, lighter on venter. Genitalia distinct from that of *T. oceanicus* and *T. commodus* (Fig. 39C). FW with 4 harp veins, shortest one not complete (Fig. 39C). Dorsum of head with indistinct longitudinal bands on occiput. File with 191 (holotype) and 177 teeth. Measurements (holotype first): Body length to end of HW 33, 32.5 mm; FW length 14.5, 13 mm; femur III length 13.0, 14.0 mm; cercal length 13 mm (broken).

Females: Similar to male in color. Ovipositor 1.28 times as long as femur III. Body length to end of HW 32 mm; FW length 14 mm; femur III length 12.5 mm; ovipositor length 16 mm.

HOLOTYPE. ♂, A-26, road to Bramston Beach from Innisfail, QLD, 28 x 1968, ANC.

SONG. Fig. 38. Two kinds tape-recorded: (a) alternation of 6–8 pulse trills and a series (18–22) of 3–4 pulse chirps; and (b) alternation of 6–9 pulse trills (as above) and continuously faster pulse trill with 30 or 50 pulses. Latter song possibly produced by courting males.

	slow trill		chirps		fast trill		kps	°C
	p/s	p/tr	p/s	p/ch	p/s	p/tr		
A-26	19.4	6	50.0	3 (4)			24	
A-26	18	7-8			56	ca. 30	24	

HABITAT. Collected in heavy introduced grass in moist depression in cleared rainforest area a few miles back of Bramston Beach, near Tully.

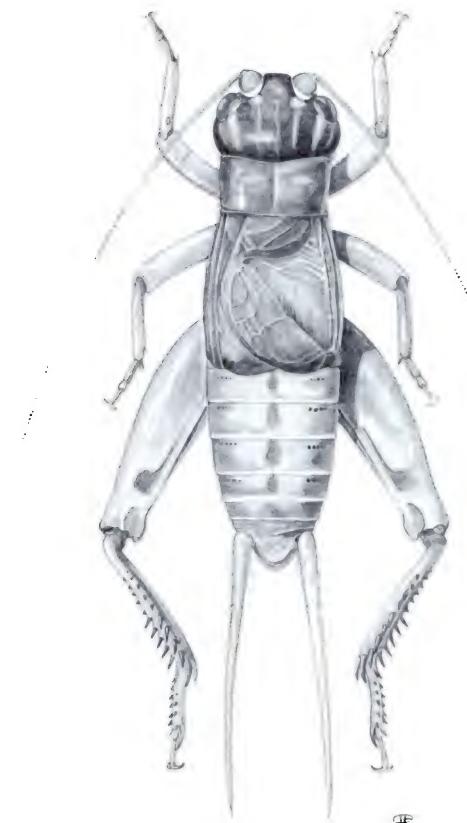
SPECIMENS. Holotype ♂ ANC. Same data, 1♀, 1♂ ANC, 1♂ ANSP.

TRIBE LANDREVINI

In his catalogue Chopard (1967) includes under the tribe *Gryllomorphini* 19 genera; these range from Africa to Australasia and one genus, *Odontogryllus* is from the Neotropics. We erect the new tribe, *Landrevini*, to include at least the following genera formerly belonging to the *Gryllomorphini*: *Landreva*, *Duolandrevus*, *Endolandrevus*, *Paralandrevus*, *Drelanvus*, *Hemilandreva*, *Lasiogryllus*, *Odontogryllodes*, *Microlandreva*, *Copholandrevus*, and *Mjöbergella*. *Gryllitara*, formerly assigned to *Eneopterinae*, *Itarini* (Chopard 1968), is also included in the tribe (see discussion below). The tribe ranges from India eastwards to Australia and Melanesia (Solomon Islands). The genera remaining in the tribe *Gryllomorphini* are *Gryllomorpha*, *Discotilla*, *Hymenoptila*, *Petaloptila*, *Acroneuroptila*, *Odontogryllus* (Neotropics), *Oreolandreva* (West Africa), and *Gryllapterus* (Seychelles Islands). To these we add the genera *Eurygryllodes* and *Malua* from Australia. The status of the last three genera is uncertain because of their geographic separation from the other five which are from North Africa, southern Europe and the Middle East.

RECOGNITION. The tribe shares with the *Gryllomorphini* two rows of spines above the spurs on the hind tibiae. It differs from European and African members of that tribe in the following: (1) Body flattened. (2) Upper lobe of clypeus not swollen. (3) Males and females with wings (these very short in some species). (4) Males of most species with stridulum. (5) Mirror sometimes present, sometimes absent. (6) Tympana variable (see Table 4) but usually present in species with stridulum and absent in those without. (7) Harp (in species with stridulum) usually with at least 5 veins. (8) Frons without setae in vicinity of the antennae. (9) Dissected males without spermatophores.

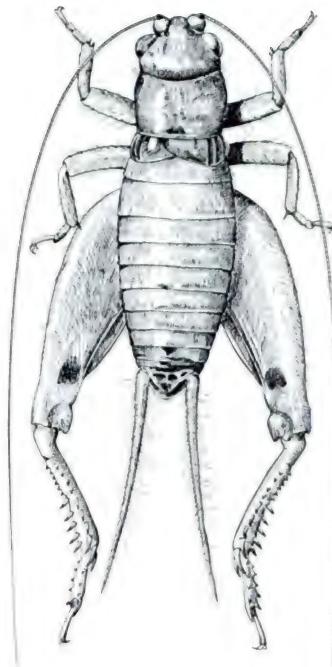
Chopard assigned the genus *Gryllitara* Chopard represented by a single species, *G. pendleburyi* Chopard, from Pahang, Malaya, to the subfamily *Eneopterinae*, tribe *Itarini*, principally on the basis

FIG. 40. *Mjöbergella warra*.

of forewing morphology. He writes (Chopard 1968: 325): "This genus has the general appearance of a true Gryllid [presumably he means grylline in shape] with a round, relatively big head and a pronotum not at all narrowing in front. On the other hand, the elytral venation is very similar to that of *Itara*, but with a very short apical field." We tentatively assign the genus to the subfamily Gryllinae, tribe Landrevini because there are no spines between the spurs as in Eneopterinae, but only above the spurs as in Landrevini. The genitalic configurations in the group are of little help in this case because the genitalia of the Landrevini are so variable as to thwart characterization. The body is not flattened in this genus suggesting that it is perhaps an aberrant member of the tribe.

Mjöbergella

1. Male FW's longer than pronotum, and with stridulum, and with or without mirror.

FIG. 41. *Copholandrevus australicus* male.

2. Tibia I with inner tympanum (except females of *M. macrocephala*).

Copholandrevus

1. Male FW's less than half as long as pronotum, and without stridulum, and without mirror.
2. Tibia I without tympanum in both sexes.

Genus MJÖBERGELLA Chopard

Mjöbergella Chopard 1925: 18. Type species: *Mjöbergella macrocephala* Chopard, by monotypy.

The genus includes only two species, both known only from the rain forests of north QLD. They live on tree trunks where they may be found under bark or in burrows in rotten wood.

RECOGNITION. Flat crickets with broad, rather square heads. Males with 6–7 harp veins, with stridulatory file and with smallish, round tympanum only on inner face of tibia I. This opening present in females of *M. warra* but lacking in females of *M. macrocephala*. Tibia III with about 4 inner and outer subapical spurs and above those 4–5 inner and outer spines. Mirror on FW present in *M. warra*, lacking in *M. macrocephala*.

macrocephala

1. Male FW without mirror or with very small one (Fig. 43D).

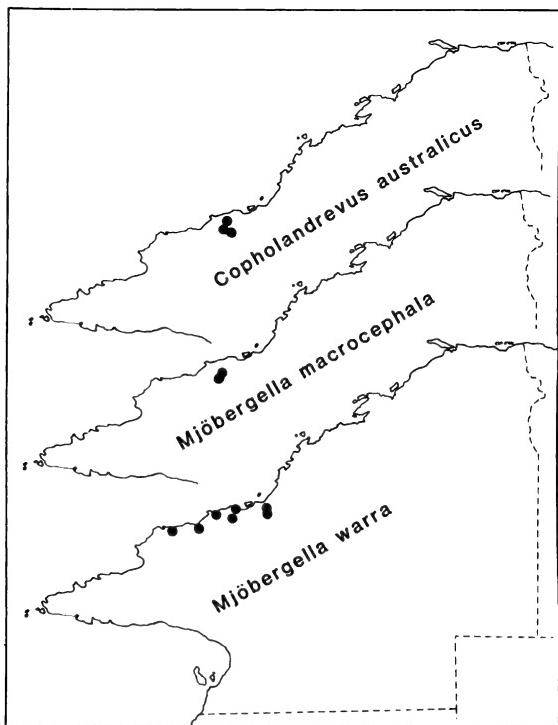


FIG. 42. *Mjöbergella* and *Copholandrevus* distributions.

2. Pronotum wider in front than back.
3. Female FW's little longer than pronotum.
4. Females without tympana.

warra

1. Male FW with mirror (Fig. 43C).
2. Pronotum with parallel sides.
3. Female FW's about half as long as pronotum.
4. Females with inner tympanum.

Mjöbergella macrocephala Chopard, Fig. 43D

Mjöbergella macrocephala Chopard 1925: 18. Holotype ♂, Manda, QLD, SM. Type examined.

RANGE. Atherton Plateau, QLD.

RECOGNITION. Male: FW's shorter than head plus pronotum and not reaching middle of abdomen. Venation as in Fig. 43D. Jaws greatly enlarged. Pronotum wider in front than in back. FW without mirror. File with 59 teeth. Male from near Millaa Millaa had following measurements: Head 1.21 times as wide as front of pronotum. Front of pronotum 1.12 times as wide as rear and 1.75 times median length. FW 1.37 times as long as wide and 1.63 times as long as pronotum. Femur III 1.69 times as long as tibia III. Tibia III 2.06 times as long as basitarsus III, with 4 outer and 4 inner subapical spurs

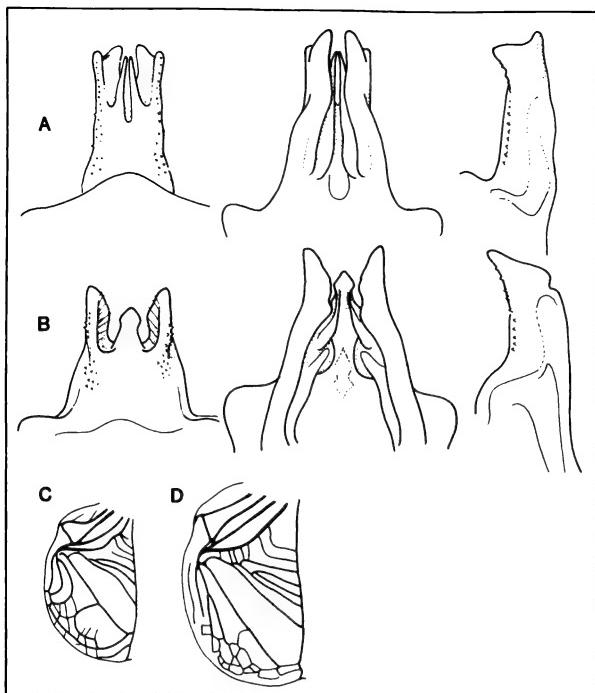


FIG. 43. *Mjöbergella* and *Copholandrevus* genitalia. A, *C. australicus*; B, *M. warra*; C, *M. warra* FW; D, *M. macrocephala*.

and above that with 4 inner and 6 outer spines. Body length ca. 20 mm; FW length 5.5 mm; femur III 11 mm; cerci ca. 10 mm.

Female: FW's little longer than pronotum, touching but not overlapping medially. Tibiae I without tympanum. Ovipositor 4.0 times as long as pronotum; and 1.1 times as long as femur III. Femur III 1.96 times as long as tibia III which is 1.9 times as long as basitarsus III.

SONG. Not known.

HABITAT. Rain forests.

SPECIMENS. Holotype ♂ SM. Millaa Millaa, QLD, 13 viii 1945 (Norris) 1♂ 1♀ ANC.

Mjöbergella warra n. sp., Figs. 40, 43BC

RANGE. Northeastern QLD coastal forests.

RECOGNITION. Males: Body flattened, black and reddish-brown on top. FW's about as long as head plus pronotum and with distinct mirror. Harp with 6–7 veins. File with 60–70 teeth. Genitalia as in Fig. 43B. Hind tibia largely black, especially between rows of spines and spurs. Pronotum not wider in

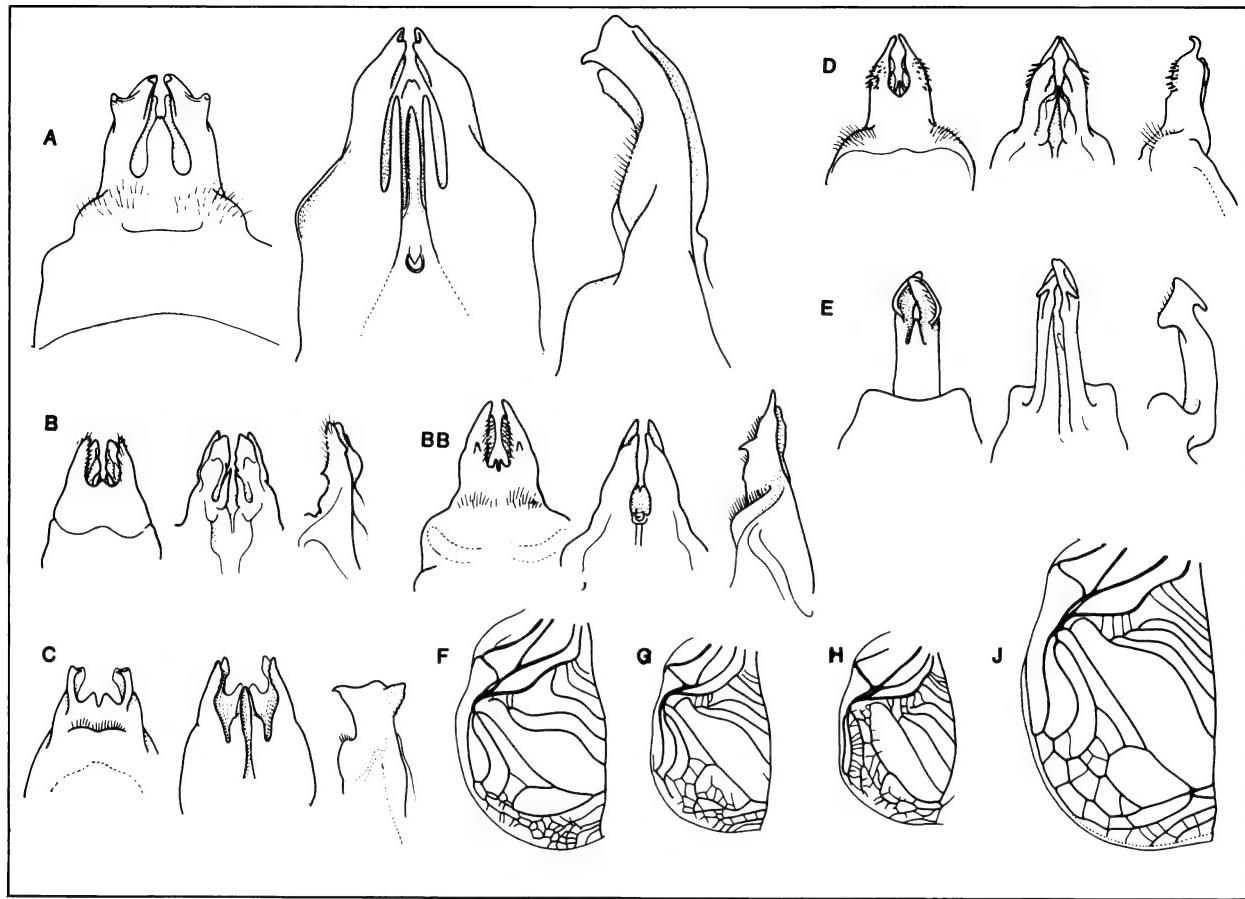


FIG. 44. Genitalia of various Landrevini (all Chopard determined). A, *Landreva clara* Ceylon; B, *Duolandrevus brachypterus* Tjibodas Java; BB, *Duolandrevus coulonianus*; C, *Endolandrevus variegatus*; D, *Paralandrevus ajax* Solomon Islands; E, *Duolandrevus* sp. (under *coulonianus* in PM); F, *Landreva clara*; G, *Duolandrevus coulonianus* Pahang F.M.S.; H, *Paralandrevus ajax*; J, *Duolandrevus brachypterus*.

front than back. Cheeks, face and mandibles black. Palpi very pale. Face, side of head and mandibles black. Head banded as in Fig. 40. Head 1.09 times as wide as pronotum. FW 2.9 times as long as pronotum. Femur III 1.53 times as long as tibia III, the latter is 0.8 times as long as basitarsus III. Tibia III with 4 inner and 4 outer subapical spurs and above that 5 inner and 6 outer spines. Body length 22 mm; FW length 7.5; femur III 12.5 mm; cerci ca. 12 mm.

Females: In coloration similar to males. FW's very small pads; about half as long as pronotum. Unlike *M. macrocephala* females of this species possess tympana on inner face of tibia I. Ovipositor about 4.5 times as long as pronotum.

HOLOTYPE. ♂, A-24, Mission Beach Road, near Tully, QLD, 1 viii 1968, ANC.

SONG. Fig. 12. Long chirps or short trills, containing 29–39 pulses.

	p/s	p/tr	kps	°C
A-24	26.5	36	3.5	24.5
A-24	42.0	26	4.3	24.5
A-24	37.4	44+	4.45	24.5
A-26	44.0	39	4.1	26
A-37	33.0	58	3.6	24
A-37	33.4	30+	4.8	24
A-37	30.0	36	3.45	24
A-274	25.3	27	3.0	19.4
A-496	39.6	ca. 25	4.0	26

HABITAT. Usually found in or on dead standing trees or fallen logs, rarely under bark on wounded living trees. Both sexes and several juvenile stages taken from tunnels and crevices under bark. There is little doubt that tunnels are made by crickets, at least in some cases. At Whyalla Plains, males and females in blind tunnels a few inches deep in downed tree. Tunnel entrances easily located because in all cases bark had been chewed away in circle several inches in diameter around them. Female with head at a tunnel entrance for several minutes suddenly reversed position, defecated, kicked pellet off ovipositor and out tunnel entrance with hind leg, then reversed again. Disturbance by us, using antennae of hand-held male, caused her first to approach entrance then to reverse position and kick with hind legs. She was finally extricated by sawing off limb while holding a thumb over hole, then drowning her in alcohol and extracting body with tweezers. In dense colonies it is profitable to search for these crickets by stripping bark off dead trees and tearing open rotten logs.

Males sing only at night, and apparently always from near tunnel entrances or crevices under bark ($n=4?$).

SPECIMENS. Holotype ♂ ANC. A-26 1♂ ANC, 1♂ UM. A-33 3♂ ANC. A-37 1♂ 1♀ ANC. A-56 1♂ 1♀ ANC. A-274 1♂ ANSP. A-277 1♂ ANC.

Genus COPHOLANDREVUS Chopard

Copholandrevus Chopard 1925: 15. Type species: *Copholandrevus australicus* Chopard, by monotypy.

The genus includes two species, *C. australicus* from Australia (Chopard 1925) and *C. brevicauda* from Sarawak (Chopard 1930).

RECOGNITION. Pale brown to orange species. Both sexes with very short FW's, not more than half as long as the pronotum. Males without stridulatory file. Both sexes without tympanal openings on tibia I. Tibiae III with set of spines above spurs (as in *Mjöbergella*). Female ovipositor longer than tibia III but shorter than femur III. Male genitalia as in Fig. 43A.

***Copholandrevus australicus* Chopard, Figs. 41, 43A**

Copholandrevus australicus Chopard 1925: 15. Holotype ♂, Evelyne, QLD, sm. Type examined.

RANGE. Rain forests of northern QLD.

RECOGNITION. Sexes very similar. Body color almost uniformly orange-brown and with dark brown spot on inner and outer faces of hind femora just anteriorly to knees. FW's very short, about half as long as pronotum and males without stridulatory file. Male genitalia as in Fig. 43A. Body finely pubescent. Tibiae I without tympana. Tibia III with 4 inner and 4 outer subapical spurs and above that 4-6 inner and 5-8 outer spines. Ovipositor 0.91 times as long as femur III and 4.1 times as long as pronotum. Femur III is about 1.6 times as long as tibia III, the latter is about 2.6 times as long as basitarsus III. Body length ca. 18 mm; femur III length ca. 12.5 mm; cerci length ca. 11 mm.

SONG. None.

HABITAT. Rain forests.

SPECIMENS. Holotype ♂ SM. The Boulders, via Babinda, QLD, 15 xii 1966 (Cantrell) 1♂ uqc. Millaa Millaa Falls, via Millaa Millaa, QLD, 10 xii 1966 (Cantrell) 1♀ uqc.

TRIBE GRYLLOMORPHINI

The tribe tentatively includes 10 genera worldwide (see discussion under *Landrevini*) but with only two genera in Australia: *Eurygryllodes* and the closely related wingless new genus, *Malua*. Both genera are from drier parts of Australia, although several species occur in wetter grasslands of the eastern highlands (see Fig. 48).

RECOGNITION. See *Landrevini* Recognition and Table 1.

Eurygryllodes

1. Males with a broad FW; females without wings.
2. Both sexes with auditory tympana.

Malua

1. Males and females without wings.
2. Both sexes without auditory tympana.

Genus EURYGRYLLODES Chopard

Eurygryllodes Chopard 1951: 446. Type species: *Eurygryllodes latipennis* Chopard 1951: 446, by monotypy.

In addition to the type species, this genus includes *Gryllus diminutus* Walker, which Chopard (1925, 1951, 1967) has placed in *Eugryllodes*, and 15 new species.

Although members of this genus are superficially

similar to Old World members of *Eugryllodes* Chopard (1927: 255), they differ in that *Eurygryllodes* have outer tympana only. *Eurygryllodes* have tiny spines proximal to the subapical spurs on the hind tibiae, and they have different male genitalia. The general similarity between these genera is most likely due to similar selection in desert habitats. We have not seen specimens of *Eugryllodes patagonus* (Saussure, 1874: 421) from northern Patagonia; Saussure's description does not mention tympana, and none appear externally on his figure of a female. Females of this species and of Old World *Eugryllodes* both have very short FW's similar to those of *Eurygryllodes* females. The adult male of *E. patagonus* has not been described. These species are so flattened that Chopard (1951, 1967) placed the genus in the subfamily Pentacentrinae with the following remark, "This very peculiar species could be taken for one of the Gryllidae [Gryllinae] were it not for the low insertion of the antennae. It is quite different from other forms of Pentacentridae, even to the shape of the genitalia which are also rather like those of Gryllidae [Gryllinae]." The similarity of the names *Eugryllodes* and *Eurygryllodes*, both Chopard names, make it a point of curiosity that Chopard did not notice the great similarity between *Eugryllodes diminutus* and *Eurygryllodes latipennis*.

This genus is the most characteristically desert-inhabiting group of Australian crickets. Most species live in the arid central part of the continent, with several species extending into southeastern New South Wales and Victoria, and several into western and southwestern Western Australia. All species live on the ground, are more or less flattened, and tend to move under low vegetation or debris. Desert species seem to live chiefly under spinifex.

The males of this genus often sing in the open, and sometimes move several inches or feet between series of calls. We have never located a female, though we have searched intensively in colonies of males, working through vegetation, excavating burrows of unknown origin, and searching extensive oatmeal trails across several hours.

RECOGNITION. Males: With inner and outer tympana (except in the Warilla Group which lack outer tympanum). Tibiae III with 1–4 small immovable spines proximal to subapical spurs (Fig. 53BC) (ex-

cept *E. wirangis*). Mirror present and usually once-divided (except in the Warrilla Group). Chord 3A usually absent (Fig. 52). Chord 1A usually branching off of chord 2A. Apical area narrow. Genitalia usually short, often obscured above by muscle tissue which attaches near median apex of epiphallus. Epiphallus usually with two median processes or with median notch (Figs. 50, 51). Pronotum usually wide and short and usually widening posteriorly. FW's usually very wide (Figs. 45, 46).

Tibia III with 3–4 subapical spurs; these greatly lengthened in two species groups. Spermatophore usually bears bulbous or puffy appendage or spermatophylax. Many songs in the group have long pulses, often delivered at very slow rate. Songs often produced in groups with males walking about between pulses, chirps, or groups of chirps.

Females scarcely known. Those of *E. warrilla* have no trace of wings. Ovipositor about 1.7 times as long as femur III.

Gorimuis Group

1. Body length about 15 mm.
2. FW more than 4.6 times as long as pronotum.
3. Pronotum width more than 2.0 times pronotal length.
4. Outer apical spurs of tibia III very long (Fig. 53C).
5. With inner and outer tympana (inner only in *weetapoonis*).
6. Mirror complete.
7. Dorsum of body yellow-brown or orange-brown.

Warilla Group

1. Body length 9–15 mm.
2. FW less than 3.0 times as long as pronotum.
3. Pronotum width less than 2.0 times pronotum length.
4. Outer apical spurs of tibia III very long (Fig. 53C).
5. With only an inner tympanum.
6. Mirror poorly developed.
7. Dorsum of body contrastingly marked with dark brown.

Diminutus Group

1. Body length ca. 12 mm.
2. FW less than 4.0 and more than 3.0 times as long as pronotum (except in *diminutus* and *buntinus* where it is more than 4.0 times as long).
3. Pronotum width less than 2.0 times the pronotum length (except *diminutus* and *buntinus*).
4. Outer apical spurs of tibia III short (Fig. 53B).
5. With inner and outer tympana.
6. Mirror complete.
7. Dorsum of body brown, gray-brown, or gray.

GORIMUIS GROUP

RECOGNITION. Body color very pale. Top of head reddish-orange or orange. Forewings more than 4.8 times as long as pronotum. Pronotum relatively wide and short—greatest width at least 2.2 times

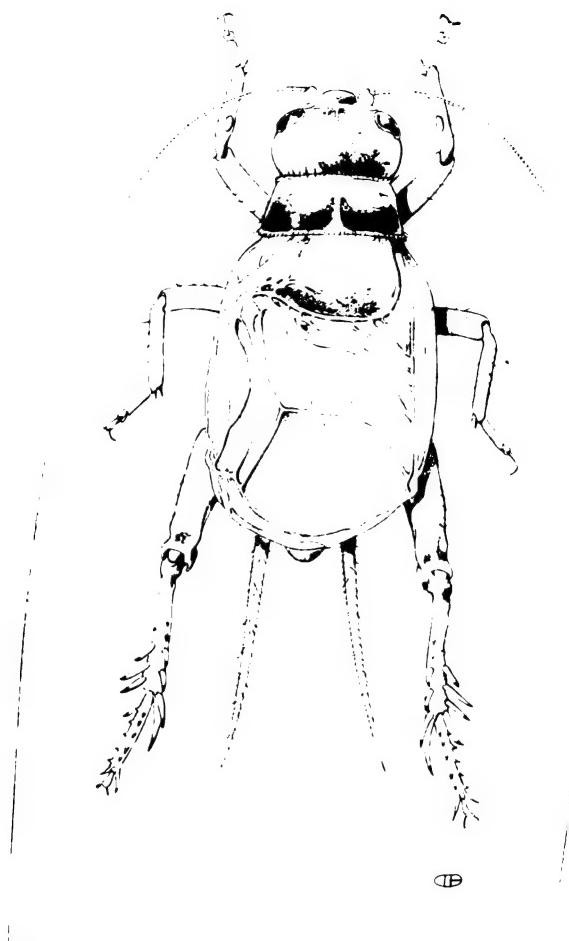


FIG. 45. *Eurygryllodes takanna*.

the median length. FW as long or longer than femur III. Posterior half of pronotum usually darker than front half. Apical area of FW with 5 or more cells.

The seven species in this group fall into three subgroups. Subgroup A includes *E. gorimuis*, *E. yerramutta* and *E. pina*; subgroup B includes *E. moordoolura*, *E. wilwindri* and *E. takanna* and subgroup C with one species, *E. weetapoonis*. The members of subgroup A are larger (body length 14 mm or more) have 6–7 harp veins and 4 inner and outer subapical spurs. The members of subgroup B are small (body length 11 mm or less), have 3–4 harp veins, and 3 subapical spurs. *E. weetapoonis*, the only member of group C, has the mirror undivided, 5 harp veins, and without an outer tympan-

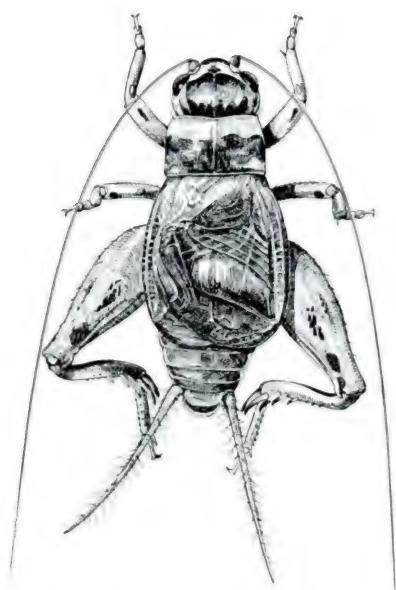


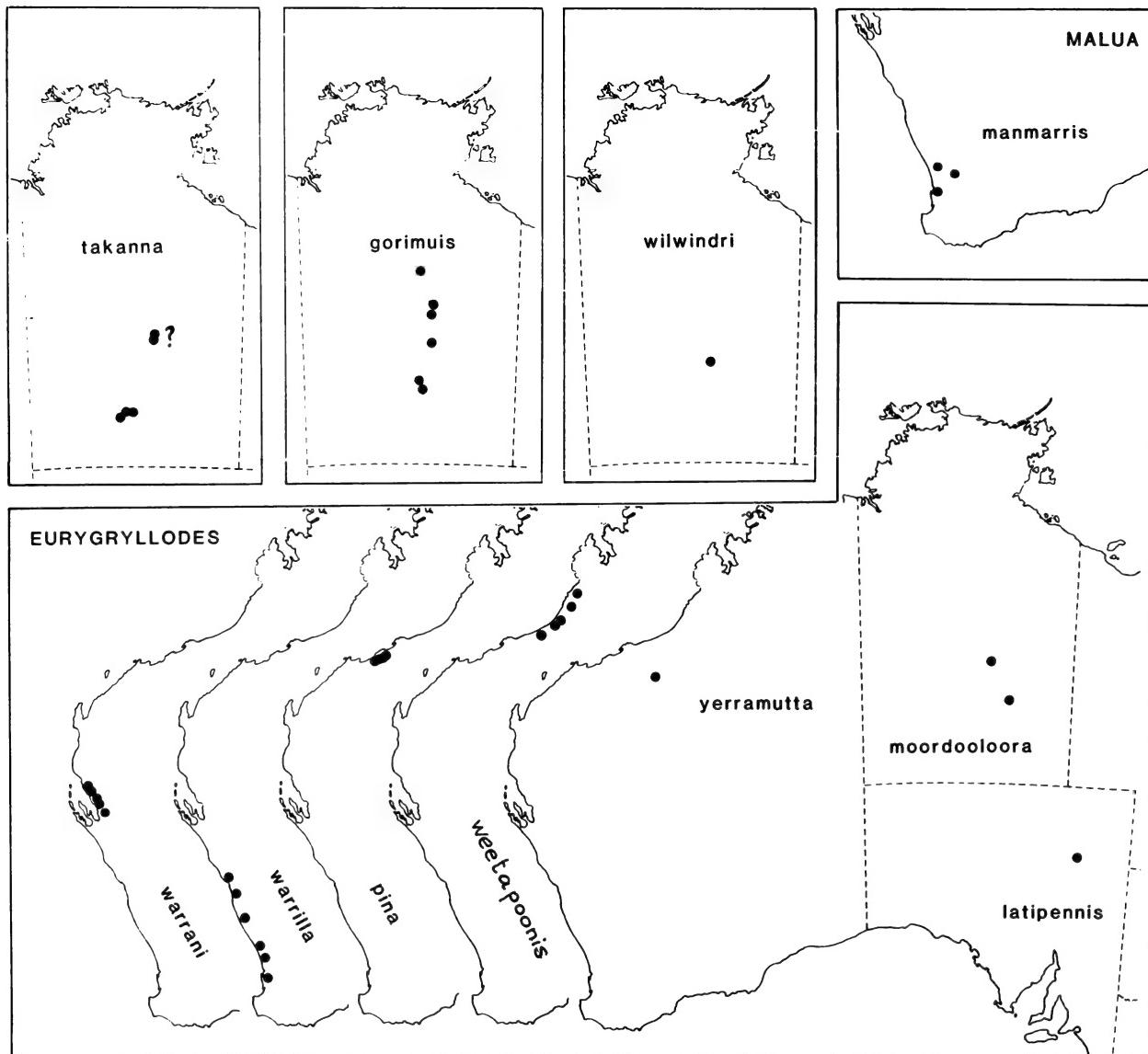
FIG. 46. *Eurygryllodes warrilla*.

um. In the last character *E. weetapoonis* is similar to the Warrilla Group.

***Eurygryllodes gorinius* n. sp., Figs. 50B, 52C, 53CJ**

RANGE. Central NT.

RECOGNITION. Males: General coloration yellowish-red to brownish, head yellowish-red, pronotum with posterior half brown. Appendages pale cream to yellowish; body greatly flattened, legs short, hind femora thick, FW's very broad, pronotum short, compound eyes nearly black. File with 264, 273 teeth ($n=2$). Harp with 6 or 7 veins. Genitalia as in Fig. 50B. Apical spurs on tibia III very long. Body length 13.5–15.5 mm; FW length 8.8–9.5 mm. FW's reach base of cerci. FW's pale, without brown pigment. Inner tympanum larger than outer. Posterior half of pronotum brown. Tibia III with 4 inner and 4 outer subapical spurs. Holotype measurements: Head 1.11 times as wide as front of pronotum; the latter is 0.90 times as wide as posterior width. FW 5.78 times as long as pronotum and 1.44 times as long as wide. Femur III 1.91 times as long as tibia III. Latter 1.8 times as long as basitarsus III. Tibia III with 4 inner and 4 outer subapical spurs and above them 2 inner and 2 outer spines. Body length 15.4 mm. FW length 9.5 mm; femur III length 8.2 mm; cerci 6.9 mm.

FIG. 47. Distributions of *Eurygryllodes* and *Malua* species.

HOLOTYPE. ♂, A-77, 24 miles south of Wauchope, NT, 18 ix 1968, ANC.

SONG. Fig. 49. Succession of slowly delivered pulses in which individual pulses are long. Pitch also unusually low.

HABITAT. Found singing under spinifex grass in open country with scattered low trees.

SPECIMENS. Holotype ♂ ANC. A-77 1♂ ANSP.

LISTENING RECORDS. A-78, A-92, A-95, A-108.

Eurygryllodes yerramutta n. sp., Figs. 50C, 53J

RANGE. Type locality in Hammersley region, northwest WA.

RECOGNITION. Males: Almost indistinguishable

	p/s	kps	°C
A-77	4.0-4.35	2.75	28
A-73	3.13-3.45	2.7-2.9	29
A-84	2.50-2.63	2.55	18

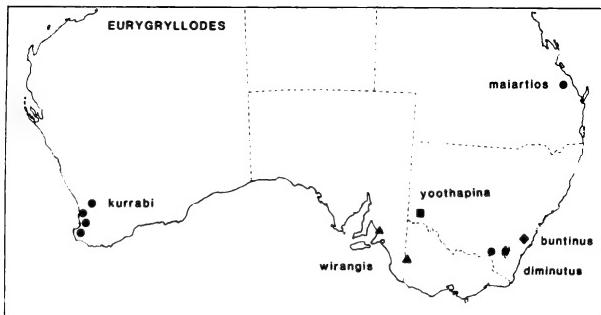


FIG. 48. Distributions of *Eurygrylloides* species.

from *E. gorimuis*, but with song pulse rate about twice as fast and genitalia differing slightly in top middle portion of epiphallus. Number of file teeth (250, 260) also similar. Holotype measurements: File with 250 teeth. Head 1.07 times as wide as front of pronotum; latter 0.92 times as wide as back. FW 5.0 times as long as pronotum and 1.34 times as long as wide. Femur III 1.84 times as long as tibia III; latter 1.79 times as long as basitarsus III. Body length 16.5 mm; FW length 10 mm; femur III 8.5 mm; cerci broken.

HOLOTYPE. ♂, A-885, 7 miles east of Marble Bar, WA, 20 v 1969, ANC.

SONG. Fig. 49. Short, 3–7 pulses, trills with pulse rate varying from 5.3 to 7.5 per second.

	p/s	kps	°C
A-884	5.3–7.5	2.7–2.95	27

HABITAT. In sandy tracts under spinifex grass, sometimes in small cavities and shallow holes.

SPECIMENS. Holotype ♂, ANC. A-885 ANC, 1♂ ANSP.

Eurygrylloides pina n. sp., Figs. 50A, 52E

RANGE. Northwest WA.

RECOGNITION. Males: Only male almost indistinguishable from *E. yerramutta* and *E. gorimuis*; darker longitudinal stripes on top of head more pronounced, but this difference may not be useful. File with only 208 teeth (n=1). Genitalia very similar to *E. gorimuis*. Song quite different and comprised of short trills with pulse rates about twice as fast as that of *E. yerramutta*. Head 1.09 times as wide as front of pronotum. Latter 0.92 times as wide as back of pronotum. FW 4.91 times as long as pronotum. Pronotal width 2.27 times pronotal length. FW

length 1.46 times FW width. Femur III 1.74 times as long as tibia III. Tibia III 1.93 times as long as basitarsus III. Tibia III with two inner and one outer spines above spurs. Body length 17 mm, FW length 9.5 mm; femur III 8.5 mm; cerci ca. 8 mm (broken at tip).

HOLOTYPE. ♂, A-736, Whim Creek, WA, 12 v 1969, ANC.

SONG. Fig. 49. Short trills with 8–12 pulses.

	p/s	kps	°C
A-736	13.6–17.4	3.1	29

HABITAT. Collected from under spinifex grass in sandy areas.

SPECIMENS. Holotype ♂ ANC.

LISTENING RECORDS. A-738, A-739, A-740, A-742.

Eurygrylloides moordoolura n. sp., Figs. 50FG, 52B

RANGE. Central NT.

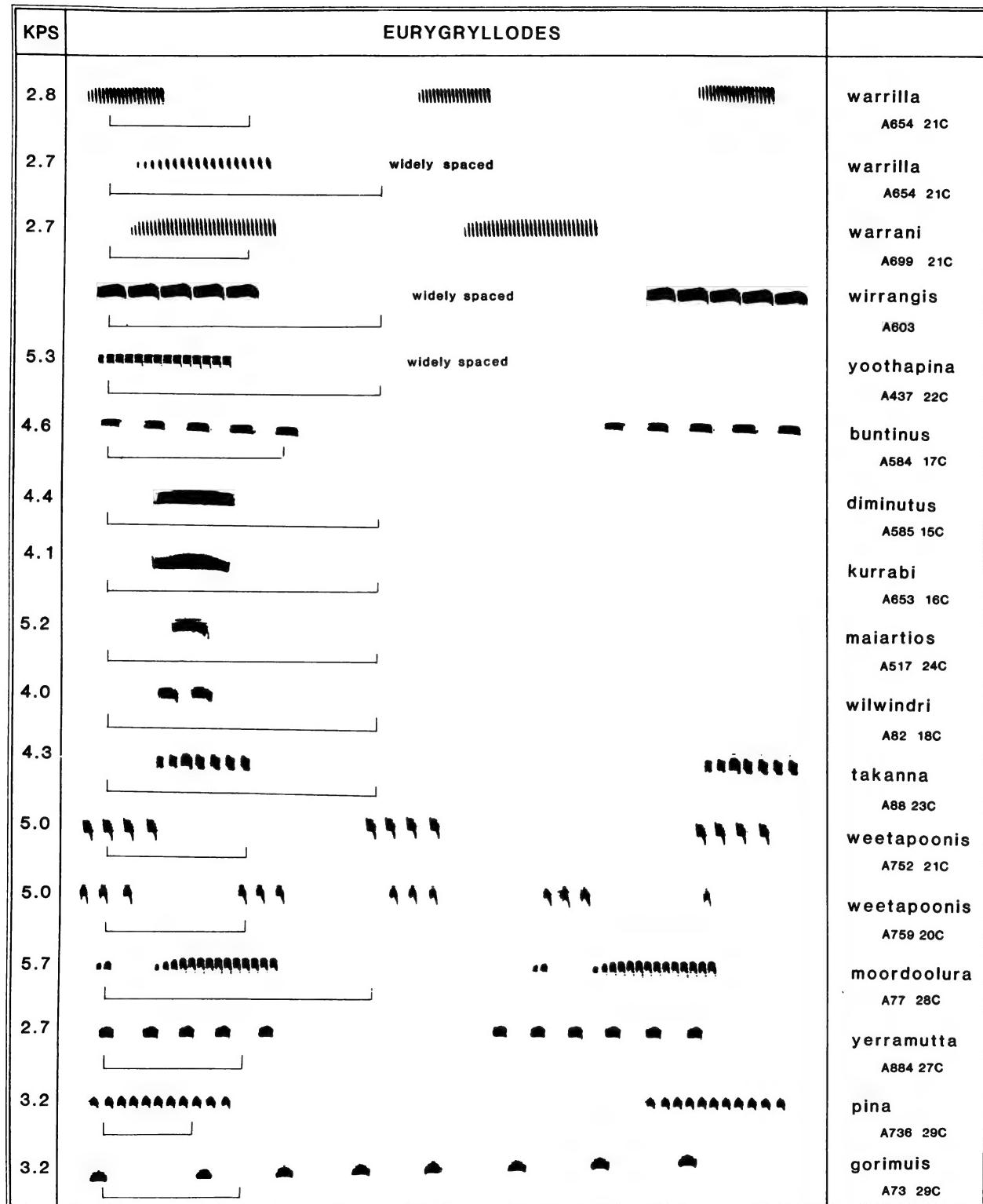
RECOGNITION. Males: Very small member of genus—body length 8 mm; femur III length 4.8 mm. Most similar to *E. wilwindri*. Harp with 3 veins. Tibia III with 3 inner and 3 outer subapical spurs and above that 1 inner and 1 outer spine. File with 140 teeth. Genitalia as in Fig. 50FG. Apical spurs on hind tibiae similar to Gorimuis Group. Holotype measurements: Head 1.05 times as wide as front of pronotum. Front 0.85 times as wide as back of pronotum. FW 4.73 times as long as pronotum and 1.49 times as long as wide. Femur III 1.73 times as long as tibia III. Tibia III 1.67 times as long as basitarsus III. Inner and outer tympana about same in size. Body length 8 mm, FW length 4.6 mm; femur III 4.8 mm; cerci broken off.

HOLOTYPE. ♂, A-77, 24 miles south of Wauchope, NT, ANC.

SONG. Fig. 49. Groups of 5–8 (n=6) 14- to 16-pulse trills. Each trill introduced by two slightly separated pulses. Separated pulses heard clearly in field; occasionally occurring twice before the first trill of a group. Group interval 4–6 s (n=3).

	p/s	p/tr	kps	°C
A-77	58.7–60.0	14–16	5.5–5.7	31

HABITAT. Males under spinifex and on ground. They walked about between groups of songs.

FIG. 49. *Eurygryllodes* songs. Scale = 0.5 s.

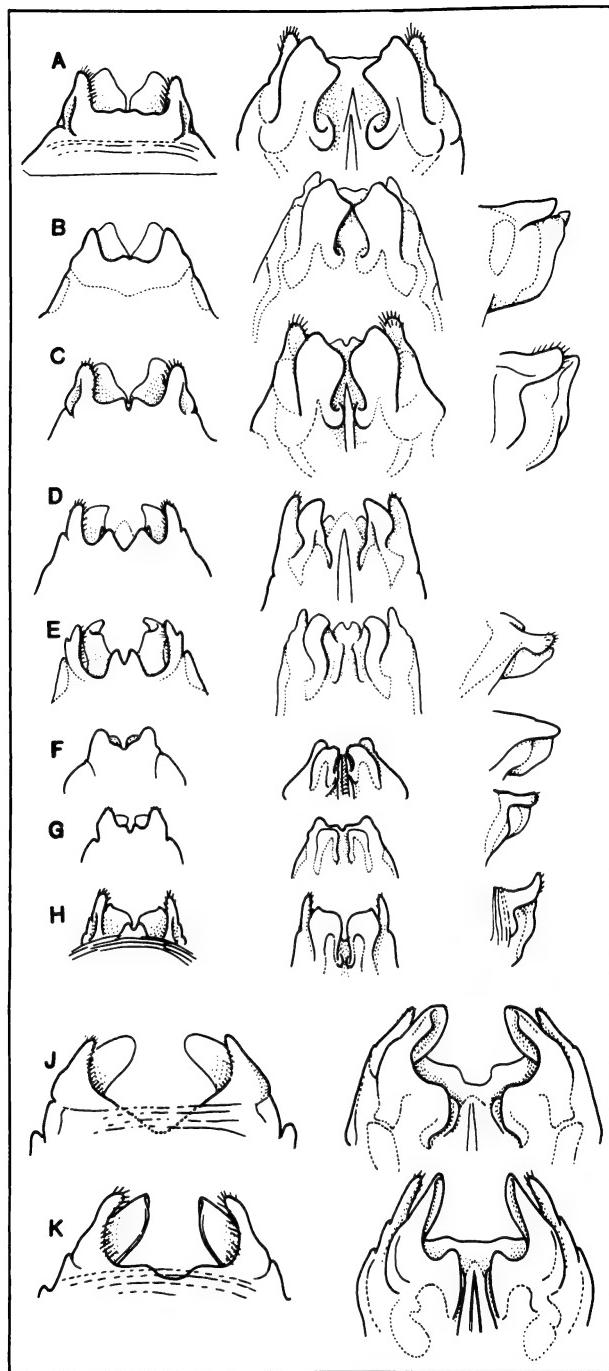


FIG. 50. *Eurygryllodes* male genitalia: dorsal view (left), ventral view (middle), lateral view (right). A, *pina*; B, *gorimuis*; C, *yerramutta*; D, *weetapoonis*; E, *takanna*; F, G, *moordoolura*; H, *wilwindri*; J, *warrilla*; K, *warrani*.

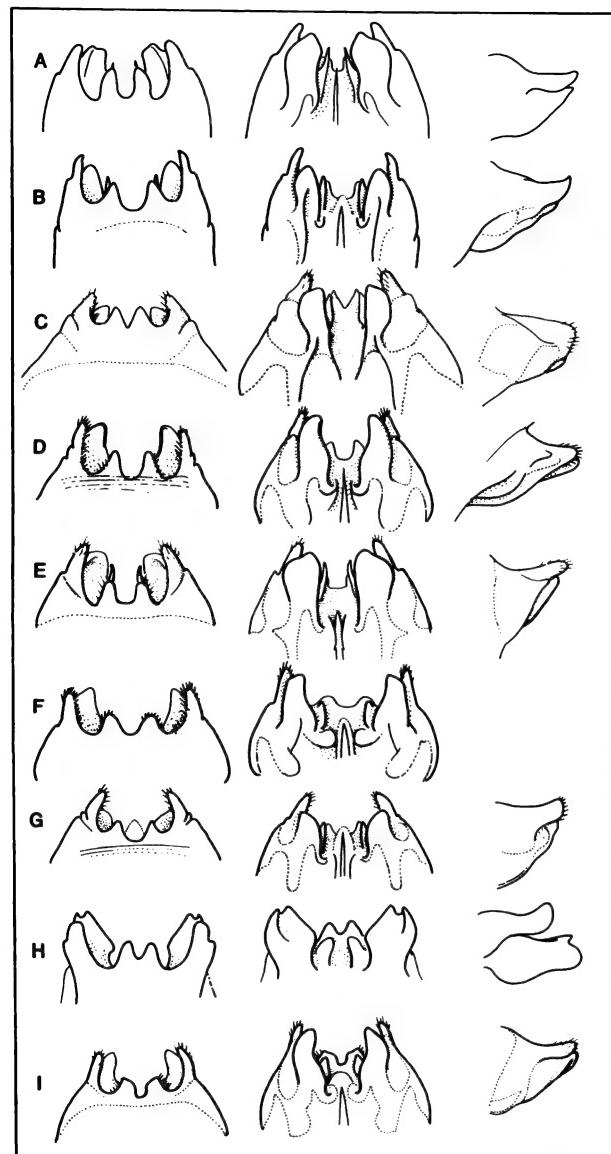


FIG. 51. *Eurygryllodes* male genitalia. A, *diminutus* holotype; B, *diminutus* from Rosedale; C, *maiartios*; D, *wirangis* A-603; E, *buntinus* A-584; F, *wirangis*; G, *kurrabi*; H, *latipennis* holotype; I, *yoothapina*.

SPECIMENS. Holotype ♂ ANC. A-77 1♀ ANC. MacDonald Downs, Central Australia, viii 1930 (S.A. Mus. Exped.) 1♂ ANC.

Eurygryllodes wilwindri n. sp., Figs. 50H, 52F

RANGE. Type locality in central NT.

RECOGNITION. Males: Very similar to *E. moordoolura* in size, color and spination, but with 181

file teeth ($n=1$) and slightly different genitalia. Only male has 3 inner and 3 outer subapical spurs and above that one inner and one outer spine. Basitarsus III with 4, 5 inner and 5, 6 outer spines dorsally. Head 1.05 times as wide as front of pronotum, front of pronotum 0.79 times as wide as rear. Greatest pronotal width 2.55 times median pronotal length. FW 5.91 times as long as pronotum and 1.51 times as long as wide. Femur III 1.60 times as long as tibia III. Tibia III 1.84 times as long as basitarsus III. Body length 9.3 mm; FW length 6 mm; femur III 5.7 mm; cerci 5.6 mm.

HOLOTYPE. ♂, A-82, 24 miles south of Barrow Creek, NT, 18 ix 1968, ANC.

SONG. Fig. 49. Rather weak 2-pulse chirp every 6 to 7 seconds ($n=8$) and pulse rate of 15.8 p/s at 18.3°C.

HABITAT. Dry grassy plain with patches of bare ground.

SPECIMENS. Holotype ♂ ANC.

Eurygryllodes takanna n. sp., Figs. 45, 50E, 52A

RANGE. Central NT.

RECOGNITION. Males: Very similar to *E. latipennis* but differing in shape of FW and genitalia. Intermediate in size between *gorimuis*-*yerramuttpina* subgroup and *moordoolura*-*wilwindri* subgroup. Genitalia definitely more like latter and more similar to those of *E. wilwindri*. Differing from *E. wilwindri* and *E. moordoolura* not only in genitalia but also in having 4 harp veins (anteriorly furthest one sometimes incomplete). File of holotype with 160 teeth. Tibiae III with 3 inner and outer subapical spurs and above that with 3–4 small spines. Basitarsus III with 4 to 6 inner and outer spines dorsally. Holotype measurements: Head 1.07 times as wide as front of pronotum. Latter 0.82 times as wide as rear. Greatest pronotal width 2.62 times pronotal length. FW 5.46 times as long as pronotum and 1.48 times as long as wide. Femur III 1.60 times as long as tibia III and latter 1.75 times as long as basitarsus III. Body length 11 mm; FW length 6 mm; femur III 6.3 mm; cerci ca. 6 mm.

HOLOTYPE. ♂, A-88, 56 miles west of Alice Springs, NT, 19 ix 1968, ANC.

SONG. Fig. 49. Succession of 7-pulse chirps at 0.7 ch/s and pulse rate of 38–39 p/s and pitched at 4.2–4.3 kps at 23.5°C. Males sang only at night.

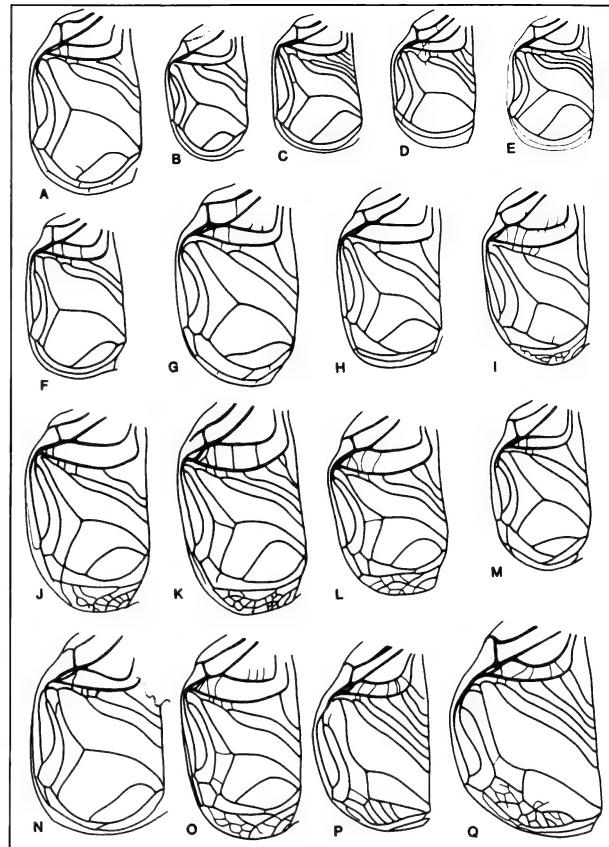


FIG. 52. *Eurygryllodes* right FW. A, *takanna*; B, *moordoolura*; C, *gorimuis*; D, *weetapoonis*; E, *pina*; F, *wilwindri*; G, *wirangis*; H, *buntinus*; I, *maiartios*; J, *diminutus* Rosedale; K, *diminutus* holotype; L, *diminutus* A-585; M, *yoothapina*; N, *latipennis* holotype; O, *kurrabi*; P, *warrilla*; Q, *warrani*.

HABITAT. Open grassy country with many bare patches of ground.

SPECIMENS. Holotype ♂ ANC. A-88 1♂ ANSP. A-89 1♂ ANC.
LISTENING RECORDS. A-74? A-75?

Eurygryllodes latipennis Chopard, Figs. 51H, 52N

Eurygryllodes latipennis Chopard 1951: 446. Holotype ♂, Kil-lapaninna, 100 miles east of Lake Eyre, South Australia, 1905 (H. C. Hillier) BM. Type examined.

RANGE. Holotype locality east of Lake Eyre, SA.

RECOGNITION. Males: Very similar to *E. takanna*, but differing from it and other members of *Gorimuis* Group in male genitalia (Fig. 51H) and wider FW's (Fig. 52N). File with ca. 191 teeth. Holotype largely destroyed in posterior half. Pronotum

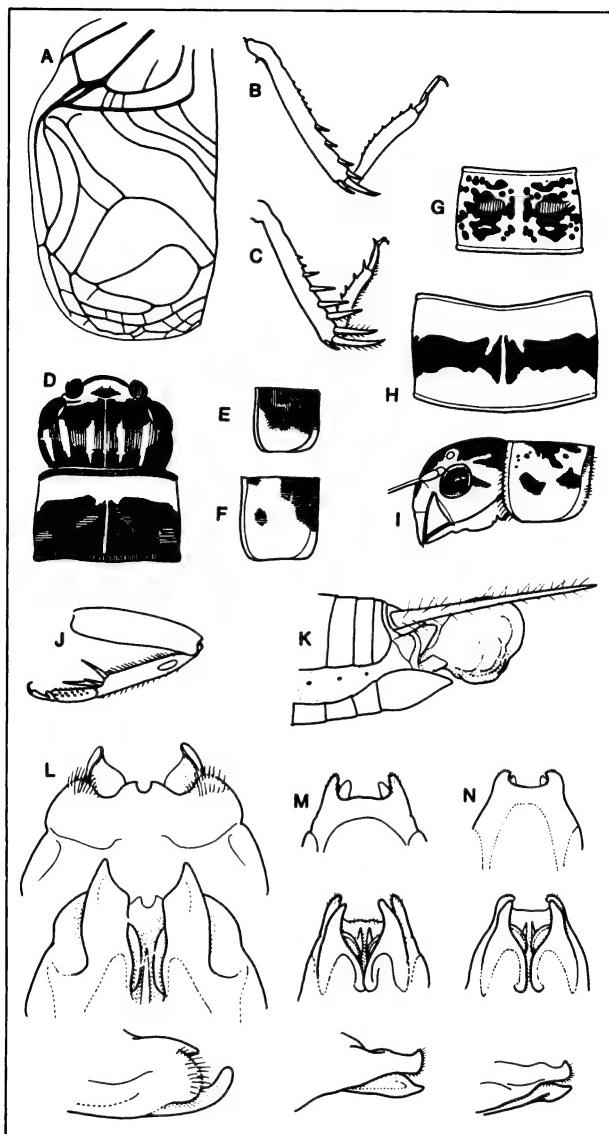


FIG. 53. *Eurygryllodes*, *Eugryllodes*, *Malua*. A, FW of European *Eugryllodes pipiens* (Chopard det. specimen); B, *diminutus* outer tibia III; C, *gorimuis* outer tibia III; D, *warrilla* head and pronotum; E, *yoothapina* lateral lobe; F, *wirangis* lateral lobe; G, *maiartios* pronotum; H, *warrani* pronotum; I, *maiartios*; J, *yerramutta* and *gorimuis* outer leg I; K, spermatophylax in *maiartios*; L, *Malua manmarris*; M, N, *Eugryllodes pipiens* from Europe (Chopard det. specimens).

strongly widening posteriorly. Head 1.12 times as wide as front of pronotum. Front of pronotum 0.79 times as wide as rear. Greatest pronotal width 2.54 times median length. Femur III with 3 inner and 3

TABLE 5. Comparison of species in the Gorimuis Group.

	Body length (mm)	Song	Number file teeth	Number harp veins	Number cal spurs	Number outer veins
<i>gorimuis</i>	ca. 15	slow trill	ca. 265	6-7	4	
<i>yerramutta</i>	ca. 15	short, slow trills	ca. 250	6-7	4	
<i>pina</i>	ca. 15	short faster trills	ca. 200	6-7	4	
<i>moordoolura</i>	ca. 8	fast pulse short trill	ca. 140	3	3	
<i>wilwindri</i>	ca. 9.5	widely spaced 2-pulse chirps	ca. 180	3	3	
<i>takanna</i>	ca. 11	intermediate 7-pulse chirps	ca. 160	4	3	
<i>latipennis</i>	ca. 12? (broken)	not known	ca. 191	3	3	
<i>weetapoonis</i>	ca. 9	slower 3-4 pulse chirps	198-220 n=3	4-5	3	

outer subapical spurs and proximal to them 3 inner and 4 outer small spines. FW about 1.58 times as wide as back of pronotum.

SONG. Not known.

HABITAT. Probably desert or semidesert.

SPECIMENS. Holotype ♂ BM.

Eurygryllodes weetapoonis n. sp., Figs. 50D, 52D

RANGE. Northwest WA.

RECOGNITION. Males: Similar to *E. moordoolura*, *E. wilwindri*, and *E. takanna* but mirror without dividing vein, tibia with only inner typanum, and harp with 5 veins. Head distinctly wider than pronotum. File with 198-220 teeth (n=3). Genitalia as in Fig. 50D. Tibia III with 3 inner and outer subapical spurs and 1-2 spines above each row. Holotype measurements: Head 1.13 times as wide as front of pronotum. Front of pronotum 0.96 times rear. Pronotum 2.27 times as wide as long. FW 4.82 times as long as pronotum and 1.39 times as long as wide. Femur III 1.70 times as long as tibia III. Latter 1.83 times as long as basitarsus III. Body length ca. 9 mm; FW length 5 mm; femur III 5.4 mm; cerci 4.5 mm. File with 220 teeth.

HOLOTYPE. ♂, A-759, 357 miles northeast of Port Hedland on road to Broome, WA, 13 v 1969, ANC.

SONG. Fig. 49. Succession of 3- and 4-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-752	12.8	0.96	4	5	21
A-759	12.5-13.8	0.64-1.8	2-3	4.4-5.0	20

HABITAT. Open woodlands. Some individuals in burrows.

SPECIMENS. Holotype ♂ ANC. A-752 1♂ ANC. A-759 3♂ ANC.

LISTENING RECORDS. A-756, A-757.

WARRILLA GROUP

Front tibia without outer tympana. Body large for genus (body length 15 mm; femur length at least 9 mm). Body generally pale but with strongly contrasting dark areas on top of head, pronotum, and abdomen (Fig. 53D). Genitalia as in Fig. 50JK. Forewing with poorly developed mirror (Fig. 52PQ). Harp with 6-7 veins. FW less than 3 times as long as pronotum. FW with numerous cells in apical area. Pronotal width less than 1.7 times pronotal length. FW less than 0.8 times femur III's length. Tibia III with very long subapical spurs (similar to Gorimuis Group) and with 4 inner and 4 outer subapical spurs.

The group now includes only two species from extreme western WA.

Eurygryllodes warrilla n. sp., Figs. 46, 50J, 52P

RANGE. Extreme western WA.

RECOGNITION. Males: Pale with strong dark markings on top of head, pronotum, and hind legs. Venter very pale. Genitalia as in Fig. 50J. Tibia I with only inner tympana. Harp with 6-7 veins. File with 40-60 teeth. Body length ca. 15 mm. Mirror poorly developed posteriorly; rather flattened from front to back, venation at back of mirror variable. Holotype with 42 teeth. Tibia III with 4 inner and 4 outer subapical spurs and above them 1-3 inner and 4-6 outer small spines. Apical spurs very long as in *E. gorimuis*. Basitarsus III with 6-7 inner and 7-8 outer small spines on top. Femora I and II with inner and outer dark mark in the distal end. Holotype measurements: Head 1.00 times as wide as front of pronotum. Latter 0.93 times as wide as rear. Greatest pronotal width 1.48 times pronotal

length. FW 2.59 times as long as pronotum and 1.35 times as long as wide. Femur III 1.57 times as long as tibia III. Latter 1.91 times as long as basitarsus III. Body length 15 mm; FW length 6.5 mm; femur III 9 mm, cerci ca. 9 mm. Females: Without trace of wings. Ovipositor ca. 1.7 times as long as femur III.

HOLOTYPE. ♂, A-692B, 6 miles south of Geraldton, WA, 9 v 1969, ANC.

SONG. Fig. 49. Succession of 12-20 pulse chirps.

	p/s	p/ch	ch/s	kps	°C
A-654	66.5-72.0	15-20	0.82-0.92	2.7-2.8	24*
A-692B	41.5-51.6	12-21	0.59-1.06	2.0-2.2	23*
n=10					

* Uncertain.

HABITAT. Usually found in brushy, sandy areas and some males found in small holes.

SPECIMENS. Holotype ♂ ANC. A-654 2♂ 1♀ ANC. A-692B 1♂ 2♀ ANC, 1♂ UM. 3 mi N Mundarah, near Caddo Springs, WA, 20 v 1966 (Skwarko) 1♂ 2♀ ANC. 7 mi SSE Yanchep, WA, 11 iv 1968 (Common, Upton) 1♂ ANC. 7 mi ESE Dongara, WA, 17 iv 1968 (Common, Upton) 1♀ ANC. Cottesloe, WA, 25 ii 1913 1♀ WAM.

Eurygryllodes warrani n. sp., Figs. 50K, 52Q, 53H

RANGE. Extreme western WA.

RECOGNITION. Males: Very similar to *E. warrilla* but genitalia slightly different and song with higher pulse rate and more pulses per chirp. Dark patterning on top of head similar to *E. warrilla*, but disk of pronotum different (Fig. 53H). Harp with 6 veins. Holotype file with 46 teeth. Holotype measurements: 0.95 times as wide as front of pronotum. Latter 0.91 times as wide as back. Greatest pronotal width 1.62 times pronotal length. FW 2.69 times as long as pronotum and 1.20 times as long as wide. Femur III 1.61 times as long as tibia III. Latter 1.55 times as long as basitarsus III. Body length ca. 15 mm; FW length 7.5 mm; femur III 9.5 mm; cerci 10 mm.

HOLOTYPE. ♂, A-699, 57 miles west of Wannoo, WA, 10 v 1969, ANC.

SONG. Fig. 49. Succession of 18 to 40 pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-699	57-65	0.76-0.98	16-40	2.6-2.7	21

TABLE 6. Comparison of species in the Diminutus Group.

	No. file teeth	FW length pronotal length	Pronotal width pronotal length	No. harp veins	No. outer subapical spurs
<i>diminutus</i>	more than 650*	more than 4.0	ca. 2.0	4-5	3
<i>buntinus</i>	ca. 400	more than 4.0	ca. 2.0	3	3
<i>maiartios</i>	ca. 375	less than 3.0	ca. 1.6	3	4
<i>kurrabi</i>	ca. 550	ca. 3.5	ca. 1.7	3	3
<i>yoothapina</i>	ca. 180	ca. 3.7	ca. 1.9	3	4
<i>wirangis</i>	ca. 300	ca. 3.4	ca. 1.9	3	4

* A male from Rosedale with 590 teeth may belong to this species.

HABITAT. Found at night on a rocky hillside in numbers. Some individuals hidden in burrows.

SPECIMENS. Holotype ♂ ANC. A-699 1♂ ANC.

LISTENING RECORDS. A-700, A-701, A-702, A-703.

DIMINUTUS GROUP

Small (body length 13 mm or less, femur III 8.5 mm or less), greyish or brownish species, top of body usually brown to dark brown. Head sometimes deep reddish-brown and often with narrow longitudinal bands especially visible on occiput. FW with dark brown band along top of lateral field and usually pigmented with brown on dorsal surface. FW usually less than 4 times as long as pronotum (except *E. diminutus*). FW with 4 or more cells in apical area. Pronotal width usually less than twice pronotal length. Femur III longer than FW. Harp usually with 3 veins (*E. diminutus* and *E. buntinus* have 4 or 5). Tibia III with 3 or 4 inner and outer subapical spurs. Apical spurs of tibia III not greatly elongated (Fig. 53B).

Eurygryllodes diminutus (Walker), Figs. 51AB, 52JKL, 53B

Gryllus diminutus Walker 1869, i: 45. Holotype ♂, 59.24, South Australia (Bakewell) BM. Transferred to *Eugryllodes* by Chopard 1951: 422. Type examined.

Although specimens collected by us have fewer than 700 file teeth we believe them to be conspecific

with the holotype (820 teeth) on the basis of the FW venation and genitalic configuration. The arrangement remains tentative, however, until the songs of the holotype population are studied; and this may be difficult since the exact type locality is not known.

RANGE. Southeastern NSW.

RECOGNITION. Top of head medium to dark brown; cheeks pale; transition to dark top sudden. Rest of body pale except for scattered dark markings. File with 820 (holotype) and 671 (A-585) teeth. Genitalia of holotype and example males as in Fig. 51AB. Harp with 4 distinct veins, sometimes with one additional indistinct one. Femur II with inner brown spot near distal end. Femur III brown at the distal end and with rows of brown markings on top and sides of distal half. FW's brownish especially in front of stridulum and back of mirror, with distinct brown band along top of lateral field. Tibia III brown below and with 3 inner and 3 outer subapical spurs and above that 2-5 small spines. Basitarsus III with 7-8 spines on top. Holotype measurements: Body length ca. 12 mm (shrunken a little); FW length ca. 8 mm; femur III 7.2 mm; tibia III 4.2 mm. An example male (A-585) had following measurements: Head 1.06 times as wide as front of pronotum. Front of pronotum 0.89 times as wide as rear. Greatest pronotal width 2.06 times median length. FW 4.53 times as long as pronotum and 1.54 times as long as wide. Femur III 1.75 times as long as tibia III. Tibia III 1.60 times as long as basitarsus III. Body length ca. 12.5 mm; FW length ca. 7 mm; femur III 8 mm; cerci 6 mm.

SONG. Fig. 49. Widely spaced, extremely long pulses. Quite similar to sounds made by some frogs and we initially thought we were hearing frogs.

HABITAT. Found in numbers at night, singing on ground in pasture.

SPECIMENS. Holotype ♂ BM. A-585 4♂ ANC, 1♂ UM Black Mountain, Canberra. ii-iii 1962-1969 (Common) 12♂ ANC. Rosedale [VIC? NSW?], 20 iv 1910 (Ingle) 1♂ ANC.

Eurygryllodes buntinus n. sp., Figs. 51E, 52H

RANGE. Type locality in southeastern NSW.

RECOGNITION. Males: Almost indistinguishable from *E. diminutus*, but file with less than 450 teeth, holotype with 393 teeth, and harp with 3 distinct veins and usually one indistinct one. Body length

11 mm; FW length 6 mm; femur III ca. 7 mm; cerci 6 mm.

HOLOTYPE. ♂, A-584, 28.5 miles SW of Camden, on Hume Highway, NSW, 27 ii 1969, ANC.

SONG. Fig. 49. Succession of 5–6-pulse trills at 8.33 to 7.69 p/s at 17.2°C.

HABITAT. Abundant in leaf litter in open eucalypt woodland.

SPECIMENS. Holotype ♂ ANC. A-584 3♂ ANSP.

Eurygryllodes maiartios n. sp., Figs. 51C, 52I

RANGE. Type locality in southeastern QLD.

RECOGNITION. Males: Generally similar to *E. diminutus* and *E. buntinus* but with the following distinguishing characteristics. Top of pronotum variegated dark brown and tan. Pronotum relatively longer than in *E. diminutus*. Mirror with incomplete dividing vein. Tibiae III with 4 inner and 4 outer subapical spurs and above that with 1–2 inner and 2–5 outer small spines. Basitarsus III with 10–12 outer spines. Harp with 3 veins, two of them widely separated from the third. File of paratype has 376 teeth (n=1). Hind knees with black crescents. Epiphallus more V-shaped centrally. Head 0.97 times as wide as front of pronotum. Front of pronotum 0.90 times rear. Rear of pronotum 1.63 times pronotal length. FW 2.75 times as long as pronotum and 1.53 times as long as wide. Femur III 1.71 times as long as tibia III. Latter 1.79 times as long as basitarsus III. Body length 12.5 mm; FW length 6 mm; femur III 8.5 mm; cerci ca. 6.5 mm.

HOLOTYPE. ♂, A-517, near Cedar Creek, 17 miles north of Monto, QLD, 22 ii 1969, ANC.

SONG. Fig. 49. Succession of long pulses at 0.67 p/s at 24°C.

HABITAT. Numerous males singing on steep grassy slopes of ravine in mesic woodland. Captured males walking in leaf litter between pulses as characteristic of members of this genus.

SPECIMENS. Holotype ♂ ANC. A-517 1♂ ANSP.

Eurygryllodes kurrabi n. sp., Figs. 51G, 52O

RANGE. Southwestern WA.

RECOGNITION. Males: Top of head and pronotum very dark, almost black. Face and cheeks dark brown. Lateral lobes largely black but with narrow milky band along front margin stopping at lateral

margins of disk. Femur III with black ring around knee. FW's brown, veins lighter than membrane. Harp with 3 veins, 2 closely spaced and anterior one separated (similar to *E. maiartios*). Holotype file with 548 teeth. Tibia III with 3 inner and 3 outer subapical spurs and above that with 3–4 inner and outer small spines. Basitarsus with about 8 outer spines on dorsal surface. Femur III with dark spots arranged in rows on top and outer faces. Holotype measurements: Head 1.04 times as wide as front of pronotum. Front of pronotum 0.80 times as wide as rear. Greatest pronotal width 1.75 times median pronotal length. FW 3.50 times as long as pronotum and 1.45 times as long as wide. Femur III 1.74 times as long as tibia III. Latter 1.72 times as long as basitarsus III. Body length ca. 12 mm; FW length 7 mm; femur III 7 mm; cerci 6 mm.

HOLOTYPE. ♂, A-653, 50 miles east of Perth, WA, 14 iv 1969, ANC.

SONG. Fig. 49. Succession of single pulses at 0.4 p/s at 15.5°C and probably usually delivered in groups.

HABITAT. Leaf and grass litter in open woodland.

SPECIMENS. Holotype ♂ ANC. A-657 1♂ ANC, 2♂ UM, 2♂ ANSP. Kalamunda, WA, 19 vi 1963 (J. Dell) 1♂ WAM. 5 mi N Nannup, WA, 1 iv 1968 (Common, Upton) 2♂ ANC. 13 mi WSW Collie, WA, 6 iv 1968 (Common, Upton) 1♂ ANC.

Eurygryllodes yoothapina n. sp., Figs. 51I, 52M, 53E

RANGE. Type locality in southwestern NSW.

RECOGNITION. Males: FW's relatively narrow and short. FW 3.7 times length of pronotum. Side of head becoming steadily darker brown dorsally (no sudden transition from pale to brown as in *E. diminutus*, *E. buntinus* and *E. maiartios*). Pronotal disk not variegated as in *E. maiartios*, darker toward the edges. Lateral lobes more or less continuously dark in upper half of lobe and a broad pale band below (Fig. 53E). Tibia III with 4 inner and 4 outer subapical spurs and only 1 or 2 outer small spines above that. Basitarsus III with 5–6 inner and 7–8 outer dorsal spines. File with 184–186 teeth (n=2). Harp with 3 veins. Genitalia as in Fig. 51I. Head 1.03 times as wide as front of pronotum. Front of pronotum 0.86 times as wide as rear. FW 3.72 times as long as pronotum and 1.52 times as long as wide. Femur III 1.79 times as long as tibia III.

Latter 1.68 times as long as basitarsus III. Body length 12.5 mm; FW length 6 mm; femur III 7 mm; cerci 5.5 mm.

HOLOTYPE. ♂, A-437, 130 miles south of Broken Hill, NSW, 11 ii 1969, ANC.

SONG. Widely separated chirps with about 15 p/ch and pulse rate of 55.0–56.4 p/s at 22°C. Males walked about between chirps.

HABITAT. Found walking about in open mulga country with scattered patches of open ground and leaf litter.

SPECIMENS. Holotype ♂ ANC. A-437 1♂ ANC.

Eurygryllodes wirangis n. sp., Figs. 51F, 52G, 53F

RANGE. Western VIC and southeastern SA.

RECOGNITION. Males: Somewhat intermediate between Gorimuis and Kulbina groups, but on the basis of genitalia and forewing venation it clearly belongs to latter. Rather pale and lacks distinct dark band along top of lateral field of FW. Back half of pronotal disk darker than front half. Lateral lobe marked as in Fig. 53F. FW's extend to bases of cerci. Harp with 3 veins. Tibia III with 4 inner and 4 outer subapical spurs and *no spines* above spurs. Basitarsus III with 7–8 inner and outer spines above. File with 299, 322 teeth (n=2). Genitalia as in Fig. 51F. Holotype measurements: Head 1.03 times as wide as front of pronotum. Front of pronotum 0.85 times as wide as rear. Greatest pronotal width 1.86 times pronotal length. FW 3.43 times as long as pronotum and 1.38 times as wide as long. Femur III 1.79 times as long as tibia III. Tibia III 1.59 times as long as basitarsus III. Body length 12 mm; FW length 7 mm; femur III 7 mm; cerci 5 mm.

HOLOTYPE. ♂, A-603, 1.5 miles east of Mt. Stapleton, VIC, 31 iii 1969, ANC.

SONG. Fig. 49. Widely spaced chirps with 5 long and closely spaced pulses per chirp, and pulse rate of ca. 15 p/s at 16°C.

HABITAT. Eucalyptus woodland.

SPECIMENS. Holotype ♂ ANC. A-603 1♀ ANC, 1♂ ANSP. Wilpena St., Eden Hills, SA, 22 ii 1967 (Kenny) 1♂ SAM.

MALUA n. gen.

TYPE SPECIES. *Malua manmarris* n. sp.

This genus is known only from the holotype male and the allotype female. Both were collected in western WA. The genus related to *Eugryllodes*.

RECOGNITION. Both sexes entirely wingless and both lacking auditory tympana. Head wider than pronotum. Pronotum wider in front than in back. Hind tibiae with 2–3 spines above spurs. Male spermatophore with spermatophylax.

Malua manmarris n. sp., Figs. 53L, 54

RANGE. Extreme southwestern WA.

RECOGNITION. Males: Entirely wingless and without tympana. Tibia III with 4 inner and 4 outer subapical spurs and above them 2 inner and 3 outer small spines. Basitarsus III with 7–8 outer and 7 inner spines on top. Genitalia as in Fig. 53L. Spermatophore with spermatophylax. Head wider than pronotum. Pronotum wider in front than back. Top of head dark reddish-brown and with 7 narrow longitudinal bands on occiput, median one merely a line. Side of head and face pale brown. Pronotal disk largely dark brown but with 4 small lighter spots in each lateral half (in addition to drop-shaped markings). Lateral lobes pale in bottom half, dark brown in upper half. Top of abdomen pubescent, mostly dark brown but with longitudinal row of lighter spots running near median line. Legs mostly pale with dark hairs. Head 1.08 times as wide as front of pronotum. Front of pronotum 1.13 times as wide as rear. Front of pronotum 1.80 times as long as pronotum. Femur III 1.84 times as long as tibia III. Latter 1.67 times as long as basitarsus III. Body length 12.5 mm; femur III 8.5 mm; cerci 7 mm.

Females: Similar to male. Body length 12.7 mm, femur III 8.5 mm, cerci 7 mm; ovipositor broken, more than 7 mm in length.

HOLOTYPE. ♂, A-653, 50 miles east of Perth, WA, 14 iv 1969, ANC.

HABITAT. Open woodland.

SPECIMENS. Holotype ♂ ANC. Mundaring Weir Catchment, WA, 24 iv 1963 (Dell) 1♀ WAM. Darlington (Perth area) 7 ix 1912 (Alexander) 1♀ ANC.

TRIBE MODICOGRYLLINI

This new tribe, with the mainly African genus *Modicogryllus* serving as the type, includes 13 Australian genera. We have examined representatives of the type species of *Modicogryllus conspersus* (Schaum) from east Africa (the type specimens are lost) and conclude that no Australian crickets belong in the genus. The tribe is best characterized as having an epiphallus with well-developed and

rather widely separated lateral lobes. A median lobe, if present, is usually small, narrow, or short. The harp almost always has only 2 veins. All members have a well-developed outer tympanum, but 3 genera also have an inner tympanum as well.

We divide the tribe into two generic groups, *Comidogryllus* Group with six genera and the *Aritella* Group with 6 genera.¹ These groupings are tentative and represent our preliminary hypothesis on generic relationship. The two groups have the following different combinations of characteristics:

Comidogryllus Group

1. Dorsum of head brownish to black (reddish in *Birubia*).
2. Tibia I always with an outer tympanum, in some species with both inner and outer tympana (see Table 7).
3. Occiput with longitudinal pale stripes (except *Yarrita* and *Birubia*).
4. Top front of head often with pale stripe connecting lateral ocelli (except *Yarrita*, *Birubia* and *Comidogryllus*).
5. Legs usually with contrasting dark marks, or entirely dark.
6. Epiphallus with strong median process (except *Lepidogryllus*).
7. Mirror always present, almost always undivided (except some *Yarrita*).
8. Pronotum usually with parallel sides or wider in back than front.

Aritella Group

1. Dorsum of head yellowish, orange, or reddish (black in some *Pictorina*).
2. Tibia I always with only outer tympanum.
3. Occiput never with longitudinal pale stripes.
4. Top front of head sometimes with pale stripe connecting lateral ocelli (except *Aritella laticaput*).
5. Legs usually more or less unicolorous, yellowish to reddish (speckled in some *Pictorina*).
6. Epiphallus with or without median process, usually without.
7. Mirror present or absent, and divided or undivided.
8. Pronotum usually wider in front than back, occasionally with parallel sides in larger winged species.

COMIDOGRYLLUS GROUP

This group includes six Australian and an unknown number of non-Australian genera; all were previously under *Modicogryllus*. Because we can see clear clusters of species within the group we have described four new genera.

This group is very widely distributed on the continent, from eastern rain forests and marshy habitats throughout the center of the continent. However, the group is clearly associated with moist habitats even in the interior. There the various species live chiefly along river banks, billabongs,

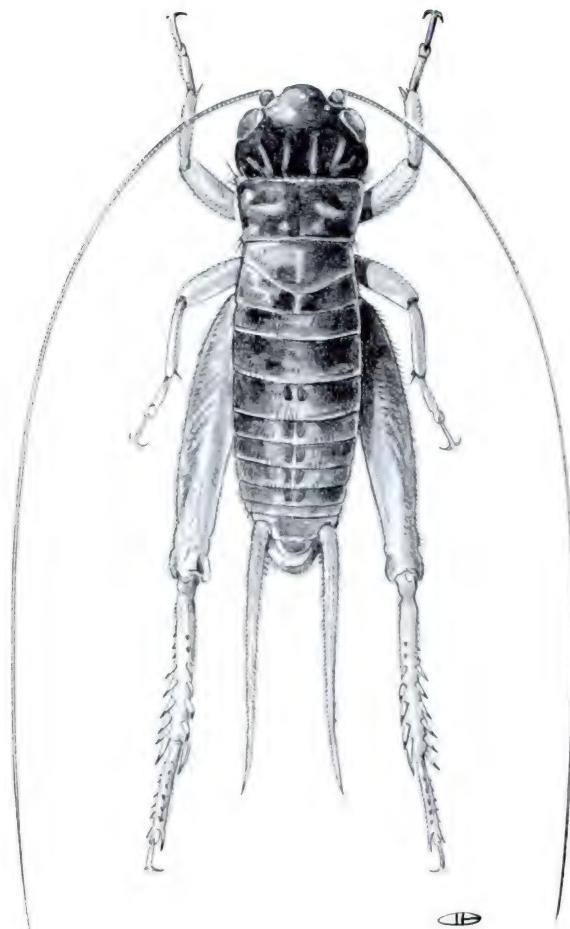


FIG. 54. *Malua manmarris* male.

water holes and bores. The group can best be characterized as "drought-evading" as opposed to "drought-enduring" (Key 1959). They are clearly less tolerant of dry conditions than the *Aritella* group.

KEY TO GENERA OF COMIDOGRYLLUS GROUP

1. Males (and sometimes females) with faces flattened (Figs. 55AB, 64AB) *Loxoblemmus*
Neither sex with face flattened (e.g., Figs. 55DJN) 2
2. Legs I and II dark brown or black. Head black (Fig. 55O). Lateral lobes black. Top of face without a distinct pale stripe connecting the lateral ocelli *Yarrita*
Legs I and II light brown to yellowish, sometimes with black markings. Head with pale bands or streaks. Lateral lobes with pale markings ventrally. Top of face with or without distinct pale stripe connecting lateral ocelli 3
3. Male genitalia generally similar to Fig. 61AB. Tibia I possessing a distinct but very small inner tympanum.

¹ The introduced *Gryllodes* fits in neither group.

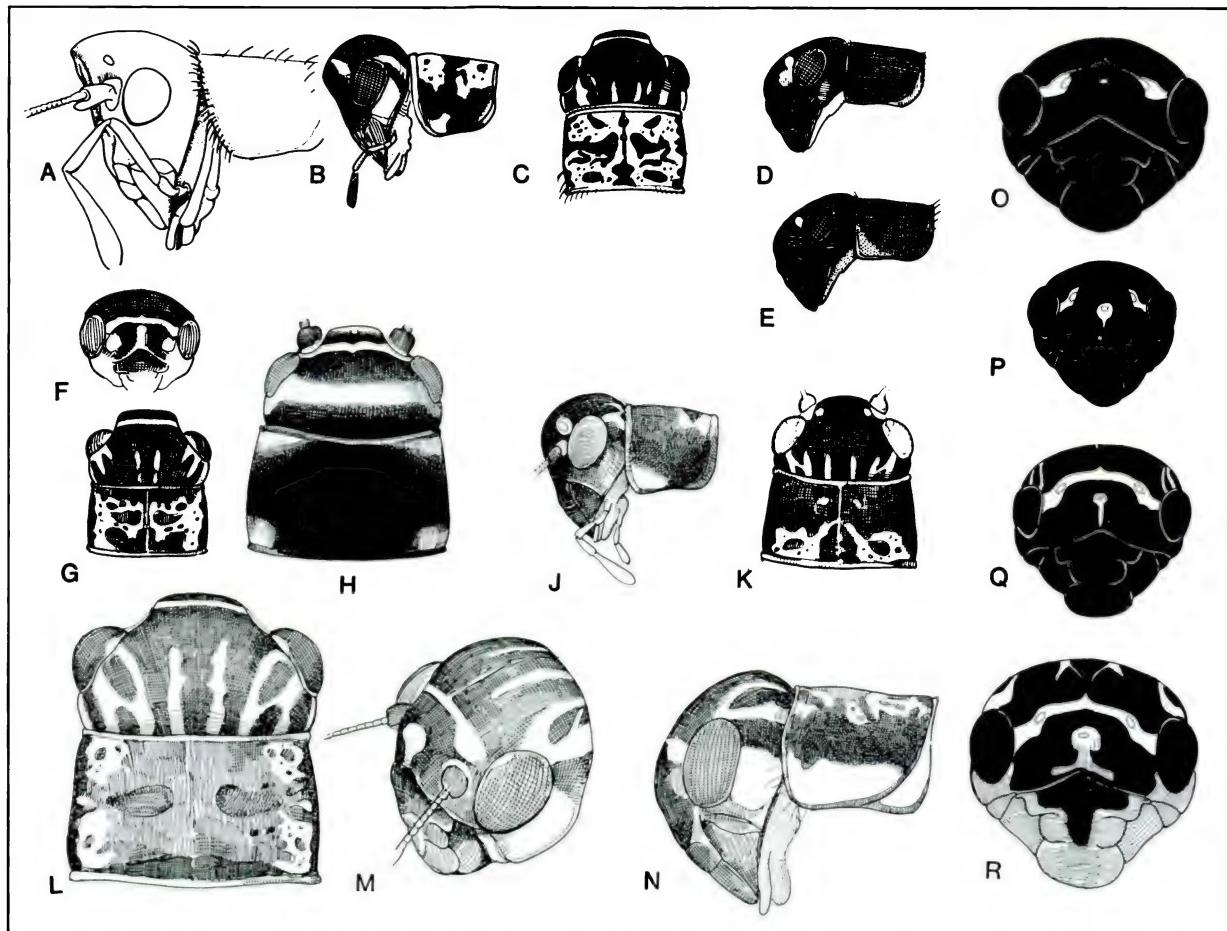


FIG. 55. A, *Loxoblemmus pallens* ♂; B, *Loxoblemmus nurroo* ♂; C, *Loxoblemmus nuroo* ♂; D, *Birubia mediocris*; E, *Birubia illalonga*; F, *Buangina kittana*; G, *Buangina kittana*; H, *Buangina scutellata*; J, *Comidogryllus adina*; K, *Comidogryllus adina*; L, M, N, *Lepidogryllus parvulus*; O, *Yarrita*; P, *Comidogryllus*; Q, *Buangina*; R, *Lepidogryllus*.

- Frons lacking white stripe connecting lateral ocelli. Pronotal disk mottled. Head typically shaped as in Fig. 55J *Comidogryllus*
 Not fitting above description. Inner tympanum usually absent (if you cannot decide whether it is present or absent assume that it is absent); if inner tympanum present then white streak connecting lateral ocelli 4
 4. Frons with pale stripe connecting lateral ocelli (Fig. 55QR). Pronotum with distinct light and dark coloration (sometimes mottled on disk) and lower region of lateral lobes at least partly pale (Fig. 55JN) 5
 Frons without pale stripe connecting lateral ocelli. Pronotal disk uniformly dark reddish-brown (Fig. 55DE). Small reddish-brown species, femur III 7 mm long or less *Birubia*
 5. Male genitalia without prominent median process (Fig. 68). Color brown or reddish-brown and cream. FW often extending to end of abdomen and usually pointed, and males with long apical area (Fig. 68A). HW's

often extending well beyond abdomen. Head usually no wider than pronotum *Lepidogryllus*
 Male genitalia with prominent median process (Fig. 75). Color usually very dark brown and cream or black and cream. FW's seldom reaching beyond end of abdomen. HW's usually hidden beneath FW's or absent. FW's usually with short apical area. Head often wider than pronotum *Buangina*

COMIDOGRYLLUS n. gen.

TYPE SPECIES. *Comidogryllus adina* n. sp.

These small field crickets live in much the same manner as their larger relatives in such genera as *Teleogryllus* and *Gryllus*. Soil cracks and crevices, mats of decaying vegetation close against the soil, and tangles of grass runners are characteristic sing-

TABLE 7. Comparison of genera in Comidogryllus Group.

Genus	Occiput with stripes	White stripe connects lateral ocellus	Tympanal condition inner/outer ¹	Mirror divided (d) or undivided (u)	Legs I and II	Disk of pronotum mottled
<i>Buangina</i>	sometimes	yes	-/O	u ²	pale brown	yes
<i>Yarrita</i>	no	no or very thin	i/O or (i)/O	d or u	black	no (black)
<i>Comidogryllus</i>	yes	no (yes)	i/O	u	speckled	yes
<i>Birubia</i>	yes	no	-/O	u	pale brown	no (dark brown)
<i>Lepidogryllus</i>	yes	yes	-/O or (i)/O	u	pale brown	yes

¹ -, tympanum absent; O, large outer; i, small inner; (i), obscure or rudimentary inner.

² Sometimes with small cells inside mirror but always without a major dividing vein.

ing locations. In some species the males are most often found in shaped, shallow excavations. Male and females both can be captured at oatmeal trails, though less effectively than most Nemobiinae. Few of the species we encountered inhabit woodlands, a little surprising when one considers the number of Australian species and the variety of woodlands available. Instead, grassy and weedy fields, stream banks and marshes, particularly areas with some bare patches of soil are the customary habitats. Two or three species are frequently found living together in a single locale. All species are nocturnal singers.

RECOGNITION. Australian members of genus possess following combination of characteristics: Forelegs with small round inner tympanum and large oval outer one. Genitalia as in Fig. 61AB. Occiput of head with 6 longitudinal stripes and with lateral two bands often joined with diagonal stripe (Fig. 55CK). Disk of pronotum mottled (Figs. 55K, 61C). Lateral lobes dark at top and at least partly pale along bottom; sometimes only lower front corner pale. Legs speckled—with dark markings and spots on pale background (Fig. 61JLM). Head shape usually as in Fig. 55J. Harp with 2 veins. Mirror complete and undivided.

NOMEN DUBIUM

Gryllodes flavigaster Saussure 1877: 213. Type in Brunner's Collection, according to Chopard (1951). A male in the BM determined by Chopard belongs to the genus *Comidogryllus*. Without the song it is very difficult, if not impossible, to determine which of our species should bear this name. We did not examine the type.

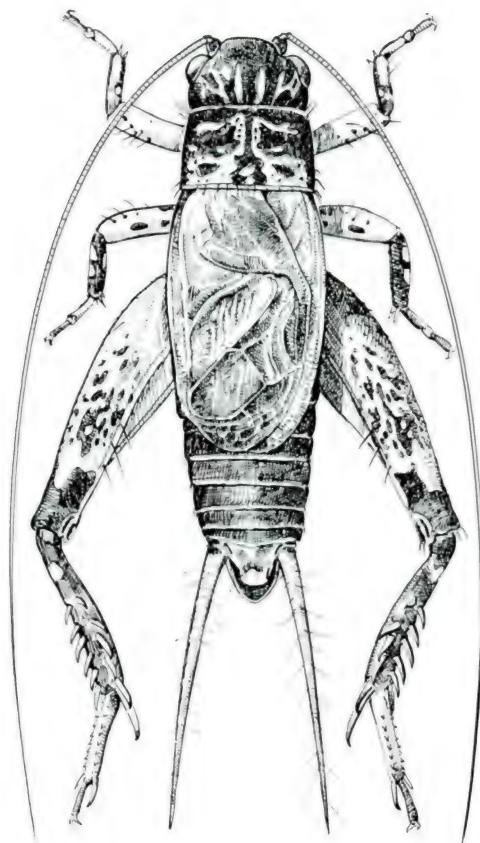
Comidogryllus adina n. sp., Figs. 55JK, 56. 61ACDJ-O

RANGE. Widespread over northern quarter of continent, but also occurring in isolated moist places in SA and NSW.

RECOGNITION. Males: Body color mostly dark brown. FW with long stridulum. Back of head with 6 longitudinal pale stripes, two most lateral ones on each side joined by oblique pale stripe (Fig. 55K). Side of head shaped as in Fig. 55J. Face dark brown from top of clypeus to top of head with large white spot surrounding median ocellus. Palpi pale, last segment with brown streak along lower surface. Pronotal disk mottled as in Fig. 55K; lateral lobe marked as in Fig. 55J. Legs I and II banded somewhat as in Fig. 61LM. Legs I and II mostly pale but with dark spots around bases of stout dark setae. Mirror nearly rectangular and undivided (Fig. 61D). Lateral field of FW dark brown in top half. Femur III with oblique stripes on the side. Top of femur III as in Fig. 61J. Tibia III somewhat banded (Fig. 61N) and with 5 inner and 5 outer subapical spurs. Basitarsus III with 7 inner and 9 outer spines. Top of abdomen mostly dark brown, banded with pale brown margins along tergites. Venter of abdomen pale. Genitalia as in Fig. 61A. Holotype measurements: Body length 14 mm, FW 6.5 mm, femur III 7.7 mm, tibia III 5.9 mm, cerci 7 mm. File with 129 teeth.

Females: Very similar to males in color. Body length ca. 15 mm; femur III ca. 7.5 mm; tibia III ca. 5.5 mm; cerci ca. 7.0 mm; ovipositor ca. 6.8 mm.

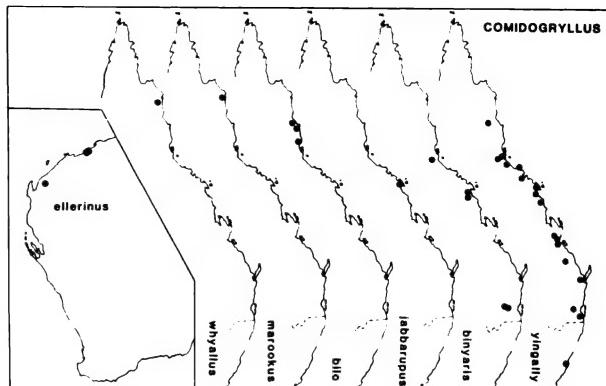
VARIATION. Macropterous individuals found at A-128, 139, 135, 815. FW varies considerably in

FIG. 56. *Comidogryllus adina*.

length, sometimes extending only slightly beyond middle of abdomen and sometimes extending to near end of abdomen. File counts for various localities as follows: A-13 (136 teeth); 14 (149, 158); 16 (127, 148); 28 (124); 33 (118, 122, 127); 34 (120); 35 (109); 20 (132); 49 (129); 115 (120, 120, 123); 131 (135); 128 (127); 133 (126); 135 (139); 286 (153); 506 (129, 115, 139, 115); 815 (125).

HOLOTYPE. ♂, A-506, Clermont, at river, QLD, 21 ii 1969, ANC.

SONG. Fig. 60. Succession of single pulses; considerable variation in pulse rate. At many NT and WA sites slower and faster pulse rate songs were originally believed to belong to two different species until we heard a single male at Mataranka, NT, switch back and forth between faster and slower pulse songs. We surmise that the faster song could be a courtship or an aggressive song. At A-33 we collected a male which was producing 1- and 2-pulse chirps and at A-34 we collected a male which was producing 3- and 4-pulse chirps. This

FIG. 57. *Comidogryllus* distributions.

population across the Daintree River, QLD, may represent a different species, but we tentatively include it under *C. adina*.

	p/s	kps	°C
A-10	0.6	4.0	23
A-19	1.1-1.5	4.2-4.3	21
A-20	1.2-1.3	3.8	21
A-28	1.1-1.2	4.2	18
A-30	1.1-1.5	4.0	21
A-41	0.7	4.4	21
A-58	0.7-1.4	4.1	21
A-60	1.2	4.4	24
A-111	8.4	4.7	21
A-111	1.5	4.7	21
A-115	6.4	4.4	26
A-127	7.7	4.6	28
A-135	7.3	4.1	28
A-147	6.7	4.1	26
A-256	6.7	4.1	24
A-256	1.6-1.8	4.4	24
A-269	1.2	3.9	21
A-408	1.7	4.6	31
A-477	2.0	4.7	28
A-767	7.8-9.3	4.3	23
A-767	4.25	4.2	23
A-767	8.7	4.1	23
A-767	4.5	4.3	23
A-780	7.8	4.3	24
A-816	1.2	3.5	23

HABITAT. Usually along banks of rivers and creeks and other moist places in open country; sometimes around natural springs and temporary ponds.

SPECIMENS. Holotype ♂ ANC. A-13 1♂ ANC. A-14 1♂ ANC. A-20 1♂ ANC. A-28 1♂ ANC. A-33 4♂ 1♀ ANC. A-34 1♂ ANSP. A-35 1♂ 1♀ ANC. A-49 1♂ ANC. A-115 4♂ ANC. A-128 1♂ ANC. A-131 1♂ 1♀ ANSP. A-133 1♂ ANC. A-135 1♂ ANC. A-139 1♂ UM. A-286 1♂ ANC. A-341 1♂ ANC. A-506 3♂ 1♀ ANC. A-767

2♂ ANC. A-815 1♂ 1♀ ANC. QUEENSLAND: Lockerbie, Cape York, vi (Monteith) 6♂ 2♀ UQC. Bamaga, Cape York, vi (Monteith), 1♀ UQC. Jardine R, Cape York, vi, 1♂ UQC. Mornington Isl, Gulf of Carpenteria, 8 vi 1960 (Aitken, Tindale) 1♂ 2♀ ANC. NORTHERN TERRITORY: 12.57S 132.33E, Jim Jim Ck, 19 km WSW Mt Cahill, 19 v 1973 (Key et al.) 1♂ 2♀ ANC. 12.35S 132.52E, Magela Ck, 2 km N Mudginbarry HS, 14 xi 1972 (Upton) 2♂ 2♀ ANC. 12.48S 132.42E, Nourlangie Ck, 8 km N Mt Cahill, 16 vi 1973 (Upton, Feehan) 1♂ ANC. 12.52S 132.50E, 15 km E Mt Cahill, 10 iii 1973 (Key) 2♂ 1♀ ANC. Mataranka, 26 iii 1955 (Key) 1♂ ANC. 16.47S 135.45E, McArthur R, 14 km SW Cape Crawford, 11 iv 1976 (Key et al.) 2♂ 1♀ ANC.

Comidogryllus whyallus n. sp.

RANGE. Type locality near Cooktown, QLD.

RECOGNITION. Body reddish-brown. Top of head red-brown and banded as in *C. adina*. Face reddish. Palpi pale. Pronotum mottled (intermediate between *C. adina* males and females). Legs I and II pale yellowish and without dark markings as in *C. adina*. Femur III with faint reddish oblique bands on top and sides. Face height of holotype 0.94 times head width. Pronotal width 1.65 times pronotal length. FW length 3.0 times pronotal length. Tibia III length 2.21 times BTS III length. FW as in *C. adina* and with 104 file teeth spaced at 42.3 teeth/mm at center. Top of abdomen reddish. Bottom of abdomen pale. Subgenital plate with two dark spots near base. Genitalia very similar to *C. adina*. Holotype measurements: Body length 11 mm, FW 6 mm, femur III 7.2 mm, tibia III 5 mm.

HOLOTYPE. ♂, A-37. Whyalla Plains, near Bloomfield, QLD, 9 viii 1968, ANC.

SONG. Fig. 59. Groups of chirps with chirps at about 12–14 ch/s. Chirps contain about 4 pulses at around 100 p/s. Chirps in groups of 7–28 (usually 9–12) separated by intervals about as long as duration of 2 or 3 chirps.

HABITAT. Singing in dry grass along road through Whyalla Plains south of Cooktown.

SPECIMENS. Holotype ♂ ANC.

Comidogryllus bilo n. sp., Fig. 61F

RANGE. Northcentral coastal QLD.

RECOGNITION. Males: Virtually indistinguishable from *C. adina*, but song quite different and file with fewer teeth. Face with narrow white line descending medially from median ocellus, becoming narrower ventrally and disappearing halfway to clypeus. Lateral lobes pale through most of ventral third. FW as in Fig. 61F, and file with 85–87 teeth (n=3). Genitalia as in *C. adina*. Holotype measure-

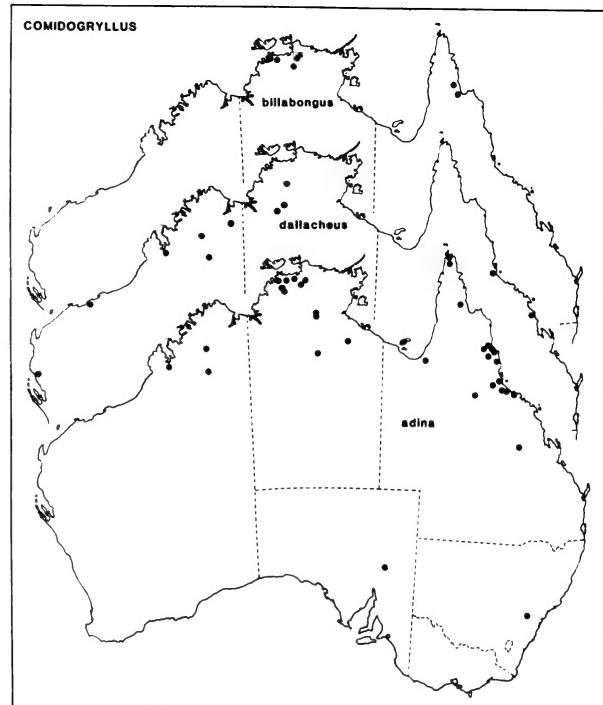


FIG. 58. *Comidogryllus* distributions.

ments: Body length 10.5 mm; head width 2.8 mm; FW 5.9 mm; femur III 7.0 mm; tibia III 5.1 mm; cercus 5.9 mm.

Females: Similar to males in coloration. FW as long as pronotum. Body length ca. 11 mm, femur III ca. 7.5 mm, tibia III ca. 5.5 mm, ovipositor ca. 6.5 mm.

HOLOTYPE. ♂, A-24, Mission Beach road at edge of rain forest, near Tully, QLD, 1 viii 1968, ANC.

SONG. Fig. 59. Groups of 3- to 4-pulse chirps. Each group contained 3 to 5 chirps. Groups produced roughly once every second.

	p/s	p/ch	ch/s	kps	°C
A-24	86	3–4	13.2	4.8	25
A-26	80	2–4	10.0	4.8	22
A-31	70	4	10	4.1	21

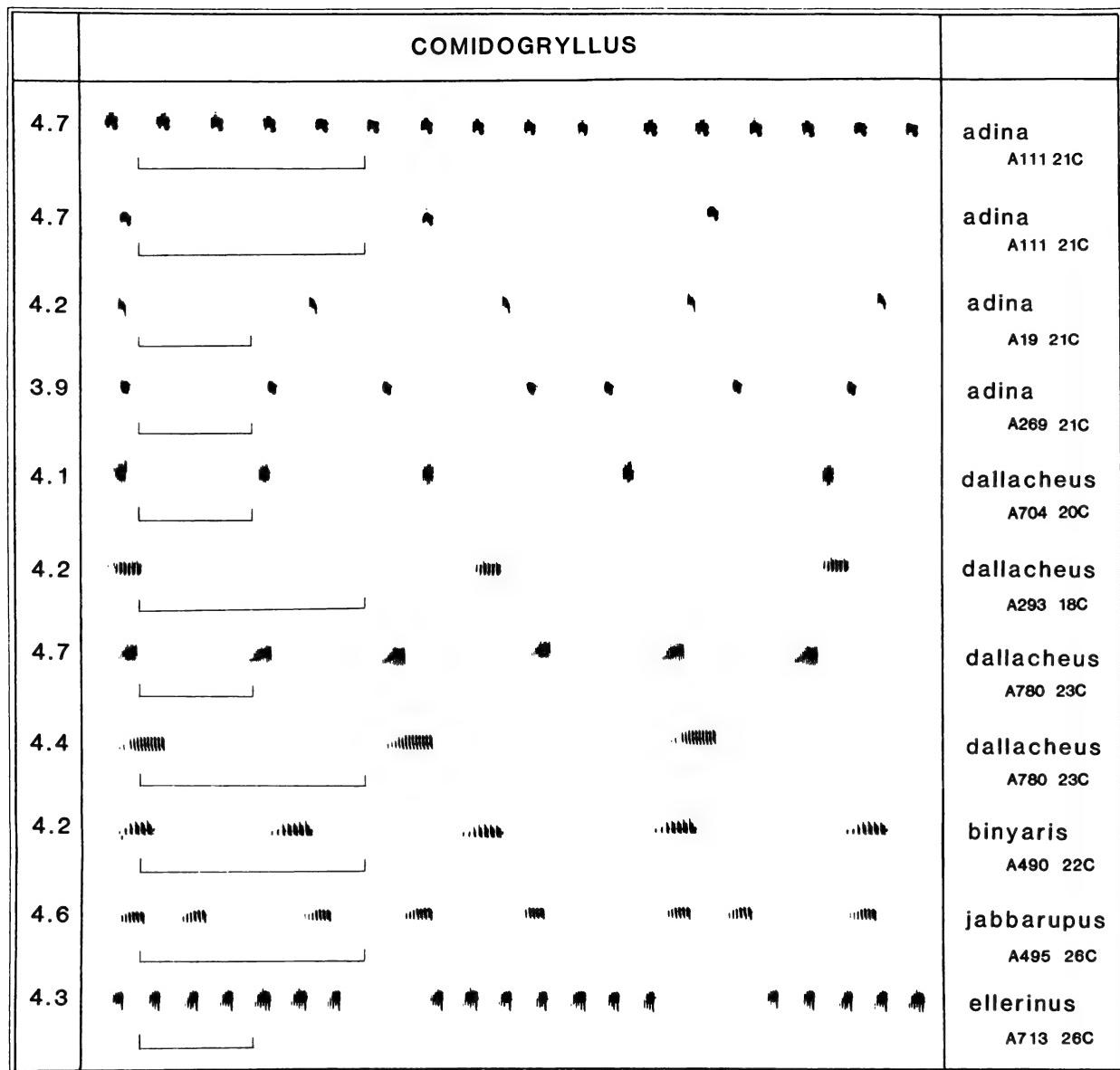
HABITAT. Along roadsides in lowland rain forests of northern QLD.

SPECIMENS. Holotype ♂ ANC. A-24 1♀ ANC, 1♂ ANSP. A-26 1♂ 2♀ ANC.

Comidogryllus billabongus n. sp., Fig. 61E

RANGE. Extreme northern NT.

RECOGNITION. Males: Similar to *C. adina* and *C.*

FIG. 59. *Comidogryllus* songs. Scale = 0.5 s.

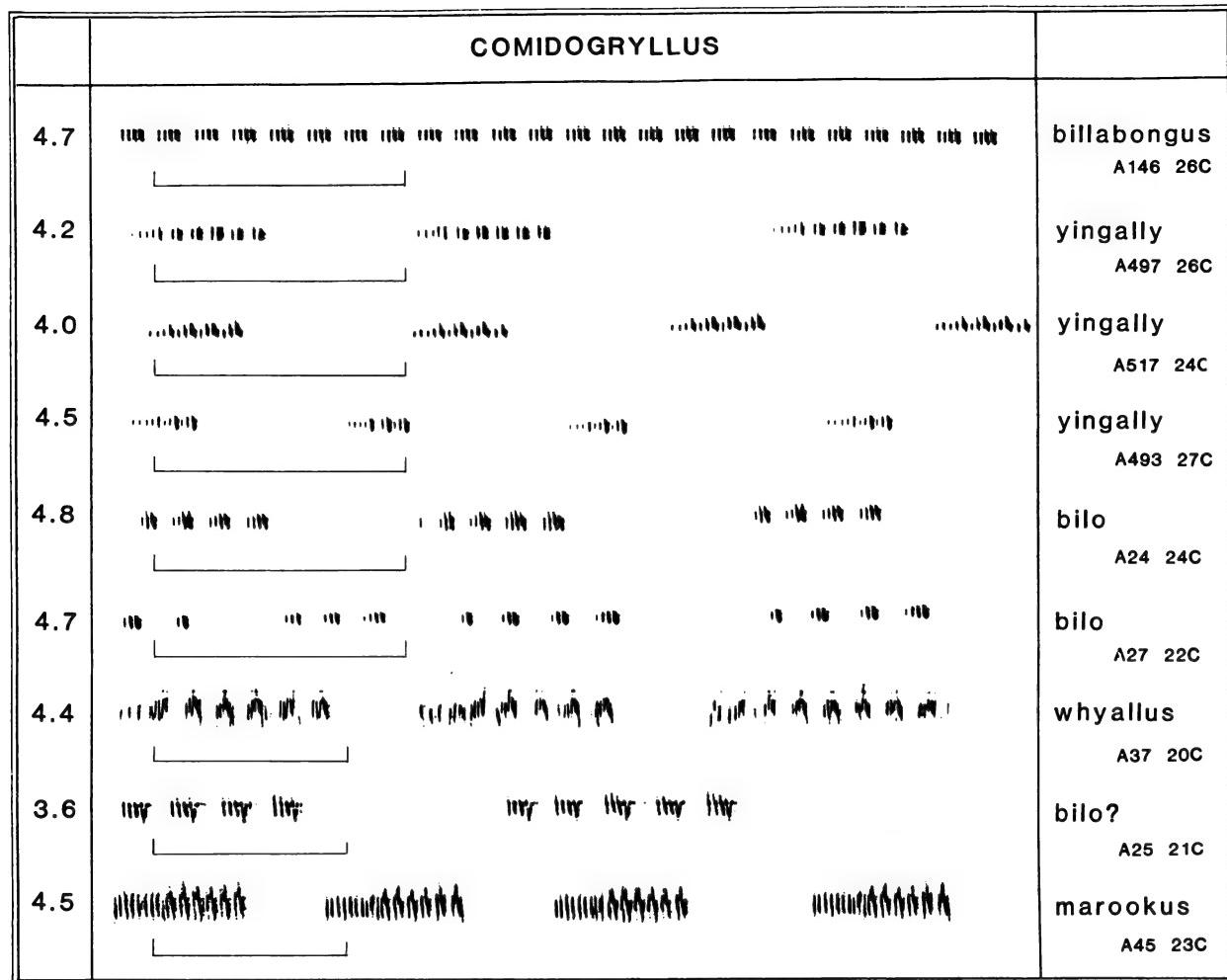
bilo and distinguishable principally on the basis of song. Lateral lobes mostly black but light brown in the lower front corner. HW extending beyond cerci. File with 70–85 teeth ($n=4$). FW venation as in Fig. 61E. Genitalia very similar to *C. adina*. Holotype measurements: Body length 13 mm, femur III 7.5 mm, tibia III 5.5 mm, FW 7.3 mm.

HOLOTYPE. ♂, A-135, 55 miles east of Adelaide River on Jim Jim Road, near Darwin, NT, 26 ix 1968, ANC.

VARIATION. File counts vary as follows: A-41 (85 teeth), A-144 (70), A-130 (77).

SONG. Fig. 59. Very rapid succession of 4-pulse chirps with high pulse rates.

	p/s	p/ch	ch/s	kps	°C
A-135	75–85	3–4	12.0	4.4–4.7	28
A-130	86	4	11.6	4.4	27
A-146	86–90	4	13.8–14.0	4.4	26
A-39	70	4	6.1–9.0	4.1–4.2	21

FIG. 60. *Comidogryllus* songs. Scale = 0.5 s.

HABITAT. Collected in moist areas around temporary ponds and in roadside ditches.

SPECIMENS. Holotype ♂ ANC. A-41 1♂ ANC. A-130 1♂ ANC. A-144 1♂ ANSP.

LISTENING RECORD. A-151.

Comidogryllus ellerinus n. sp.

RANGE. Known only from the Ashburton River, WA.

RECOGNITION. Males: Very similar to *C. adina*, differing principally in song. FW with 91, 97 teeth. Genitalia very similar to *C. adina*. Body length 13 mm, femur III 7.8 mm, tibia III 5.4 mm.

HOLOTYPE. ♂, A-713. Ashburton River on Route 1, WA, 11 v 1969, ANC.

SONG. Fig. 60. Similar to *C. billabongus*. Rapid succession of 4–6 pulse chirps with very high pulse rate.

	p/s	p/ch	ch/s	kps	°C
A-713 n=4	93–135	4–6	6–10.2	4.3–4.5	ca. 26

HABITAT. In soil cracks along riverbanks and under rocks in dry portions of riverbanks.

SPECIMENS. Holotype ♂ ANC. A-713 1♂ ANC.

LISTENING RECORDS. A-740, A-741.

Comidogryllus dallacheus n. sp., Fig. 61H

RANGE. Northern WA and NT and coastal QLD.

RECOGNITION. Males: Very similar to *C. whyallus*. Reliably distinguished only on the basis of song

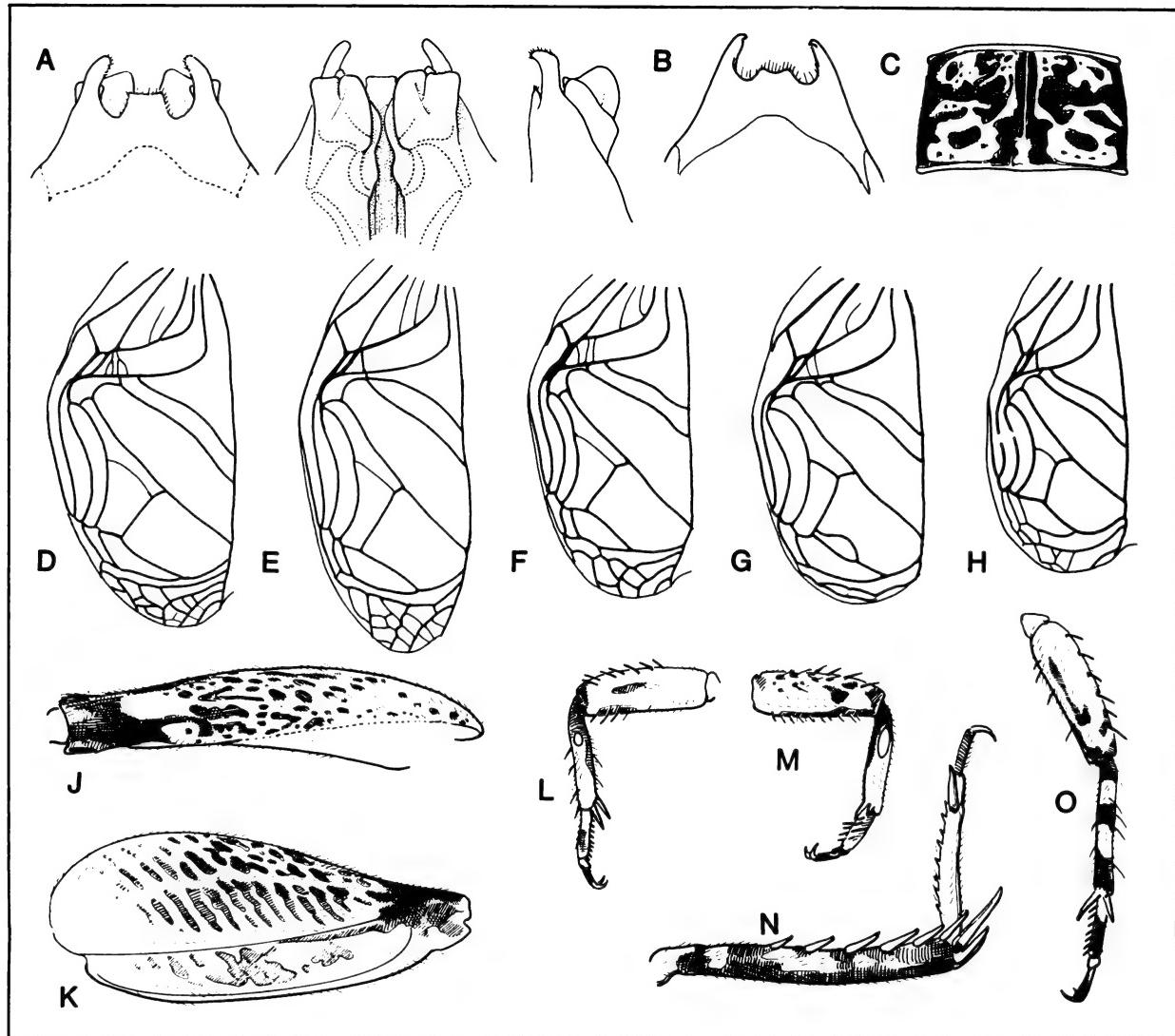


FIG. 61. *Comidogryllus*. A, *adina* male genitalia (dorsal, ventral, lateral); B, *dallacheus* (dorsal); C, *adina* pronotal disk; D, *adina*; E, *billabongus*; F, *bilo*; G, *yingally*; H, *dallacheus*; J, *adina* femur III upper; K, *adina* femur III outer; L, *adina* femur I inner; M, *adina* femur III outer; N, *adina* tibia III inner; O, *adina* leg II inner.

(see below). Body color reddish. Genitalia as in C. *adina*. File with 69–88 teeth ($n=5$). Body length 11.5 mm, FW 6.5 mm, femur III 7 mm, tibia III 5 mm, cerci 6 mm.

Females: (A-704). FW's not quite reaching middle of abdomen, about 2.14 times as long as pronotum. Ovipositor 0.83 times as long as femur III. Tibia III with 5 inner and 7 outer subapical spurs. Body length ca. 15 mm; femur III length ca. 8.5 mm.

HOLOTYPE. ♂, A-23, Dallachy Creek, on Route 1, south of Tully, QLD, 6 ix 1968, ANC.

SONG. Fig. 60. Succession of very short chirps which sometimes sound like single pulse. Chirps contain 5 to 8 pulses. Pulse rate around 100 p/s.

	p/s	p/ch	ch/s	kps	°C
A-23	100–105	7–8	1.6–1.7	4.3	22
A-738	90	5–8	1.4	4.2	19
A-293	110	7	1.3	4.2	18
A-704	115–125	5–9	1.2–1.3	4.1	20
A-162	125–130	10–13	0.9–1.8	4.3–4.6	27
A-767	108	8–9	2.0	4.2	23
A-780	111–133	9–13	1.7–2.3	3.9–4.7	23
A-831	118	12	2.0	3.9	22

HABITAT. Found in short grasses by roadsides in QLD and in green grass and under piles of dead leaves along Gascoyne River, WA.

SPECIMENS. Holotype ♂ ANC. A-293 1♂ ANSP. A-704 5♂ 1♀ ANC. A-162 2♂ ANC. A-767 1♂ ANSP. A-780 1♂ ANC. A-831 1♀ ANC.

LISTENING RECORDS. A-166, A-168, A-181.

Comidogryllus binyaris n. sp.

RANGE. Eastern QLD.

RECOGNITION. Males: Very similar to *C. adina* but smaller. Tibia III mostly dark brown except for small pale band 2 tibial diameters from proximal end. File with 78–80 teeth (n=2). Genitalia similar to *C. adina*. Holotype measurements: Body length 10.5 mm, FW 6 mm, femur III 6.5 mm; tibia III 4 mm, cerci 6 mm.

Females: (A-536). FW's 2.1 times as long as pronotum. Femur III 0.73 times as long as tibia III and 3.7 times as long as pronotum. Body length ca. 12 mm; femur III ca. 6.8 mm.

VARIATION. In males from A-497 and A-536 head very dark and bands on back of head scarcely visible. Pronotum also largely black. In a female from A-536 FW 0.58 times as long as femur III. Top of abdomen mottled light and dark brown. Ovipositor 0.78 times as long as femur III.

HOLOTYPE. ♂, A-490, 10 miles west of Paluma on Mt. Spec, QLD, 19 ii 1969, ANC.

SONG. Fig. 60. Succession of short, rather widely spaced chirps with 5 to 6 pulses per chirp.

	p/s	p/ch	ch/s	kps	°C
A-490	78	6-7	2.7	4.2	22
A-536	75	6-7	1.5	4.1	19

HABITAT. Roadside in eucalyptus woodland.

SPECIMENS. Holotype ♂ ANC. A-490 1♂ ANSP. A-497 1♂ ANC. A-536 1♂ 1♀ ANC.

LISTENING RECORDS. A-491, A-499, A-537.

Comidogryllus jabbarupus n. sp.

RANGE. Type locality near Proserpine, QLD.

RECOGNITION. Males: Similar to *C. adina*. Clearly distinguishable from other species only on the basis of song. FW with 88 file teeth. Genitalia as in *C. adina*. Body length 12.7 mm, FW 6 mm, femur III 6.8 mm, tibia III 4.8 mm, cerci 6.5 mm.

HOLOTYPE. ♂, A-495, Lethe Brook, 5 miles south of Proserpine, QLD, 20 ii 1969, ANC.

SONG. Fig. 60. Somewhat similar to *C. dallas-*

TABLE 8. Comparison of *Comidogryllus* species.

Species	Song	No. file teeth
<i>adina</i>	single pulse chirps (slow trills) (Fig. 60)	115–158 n= 31
<i>bilo</i>	complex chirps (Fig. 59)	85–87 n= 3
<i>yingally</i>	complex chirps (Fig. 59)	ca. 80
<i>billabongus</i>	rapid succession of 4-pulse chirps (Fig. 59)	70–85 n= 4
<i>ellerinus</i>	rapid succession of 4–6 pulse chirps (Fig. 60)	91, 97 n= 2
<i>whyallus</i>	groups of rapid pulse rate chirps (Fig. 59)	104 n= 1
<i>dallaceus</i>	8–14 pulse chirps, very rapid pulse rates (Fig. 60)	69–88 n= 5
<i>binyaris</i>	short, widely spaced chirps (Fig. 60)	78, 80
<i>jabbarupus</i>	irregular series of 5–7 pulse chirps, rapid pulse rate (Fig. 60)	88
<i>marookus</i>	chirps consisting of trills followed by paired pulses (Fig. 59)	71

cheus. Irregular series of 5–7 pulse chirps with pulse rate in excess of 100 p/s.

	p/s	p/ch	ch/s	kps	°C
A-495	120	6-7	4.7	4.6	26

HABITAT. Found singing in grass along roadside.

SPECIMENS. Holotype ♂ ANC.

Comidogryllus marookus n. sp.

RANGE. Type locality in northern coastal QLD.

RECOGNITION. Similar to *C. adina*. Body color generally dark. Top of head dark brown to black. Six bands on back of head somewhat indistinct. Lateral lobes of pronotum pale in ventral half (except for black margin). FW with 70–79 file teeth (n=5), holotype with 71 teeth. Legs marked roughly as in *C. adina*, except femora III which have rather indistinct oblique brown lines on top external surface. Portion of abdomen between cerci dark brown (unlike other species). Cerci also brown. Genitalia as in *C. adina* except central process slightly concave across posterior margin. Holotype measurements: Body length 11.3 mm; FW 6 mm; femur III 7 mm; tibia III 5.2 mm; cerci 6 mm.

Females: (A-36). FW 2.18 times as long as pronotum. Ovipositor 0.74 times as long as femur III and 2.91 times as long as pronotum. Body length 11 mm, femur III length 8 mm.

HOLOTYPE. ♂, A-36, South side of Cooktown, Cape York, QLD, 8 viii 1968, ANC.

SONG. Fig. 59. Complex chirps which begin with very brief ragged trill and terminate with four or five pulses that appear double.

HABITAT. At Cooktown a colony found singing in dry wash. At Iron Range a male taped in clearing outside rain forest.

SPECIMENS. Holotype ♂ ANC. A-36 3♂ 3♀ ANC.

Comidogryllus yingally n. sp., Fig. 61G

RANGE. Coastal QLD and NSW.

RECOGNITION. Males: Very similar to *C. adina*, including the genitalia. Face similar to *C. bilo*, with pale spike descending from median ocellus. Holotype file with 86 teeth. Holotype mirror with small cell near back end (Fig. 61G). Femur not as strongly striped on side as in Fig. 61G. Holotype measurements: Body length 12 mm, femur III 7 mm, tibia III 6 mm, FW 6.3 mm, cerci ca. 7 mm.

Females: (A-517). FW's 2.0 times as long as pronotum. Ovipositor 2.86 times as long as pronotum and 0.85 times as long as femur III. Body length ca. 15 mm; femur III length ca. 8.3 mm.

HOLOTYPE. ♂, A-294 at creek, 2.2 miles north of junction of roads to Seaford and Mt. Jukes, QLD, 5 xi 1968, ANC.

SONG. Fig. 59. Chirps with paired pulses.

	p/s	p/ch	ch/s	group/s	kps	°C
A-538	55	2	22.2	1.5	4.4	24
A-517	56-67	2-3	18.8-22.2	1.6-2.0	4.0-4.5	24
A-495	83	3	26.7	2.7	4.1	26
A-497	77	2	25.0	1.8	4.2	26
A-493	83	3	27.0	2.3	4.5	27
A-491	67	3	21.0	1.8	4.1	21
A-301	77	2-3	25.0	2.5	4.4	30-32
A-310	56	2-3	17.0			16
A-35	67	2-3	16.6	2.7	3.8	22?
A-35	63	3	17.2	1.8	3.8	22?
A-298	71	3	21.0	1.6	3.7	18
A-23	67	3	22.7	1.8	4.1	22?
A-294	67-77	3	20.0-27.0	1.9-2.1	3.7-3.8	18
A-51	62.5	2-3	20.0	1.5	4.0	22
A-20	60	2	16.7	1.3	3.8	21
A-17	33.5	2	13.3	0.8	4.3	14
A-3	30	2	15.2	1.4	2.6	18

HABITAT. Grassy areas along coastal QLD. Usually found in areas neither very wet nor very dry.

SPECIMENS. Holotype ♂ ANC. A-14 1♂ UM. A-20 1♂ ANC. A-51 1♂ ANC. A-335 1♂ ANC. A-517 1♂ 1♀ ANC. A-537 1♂ ANC. A-538 1♂ ANC. A-299 1♂ ANC. A-278 1♂ ANC.

Genus LOXOBLEMMUS Saussure

Loxoblemmus Saussure 1877: 249. Type species: *Loxoblemmus equestris* Saussure, subsequent designation by Chopard 1967.

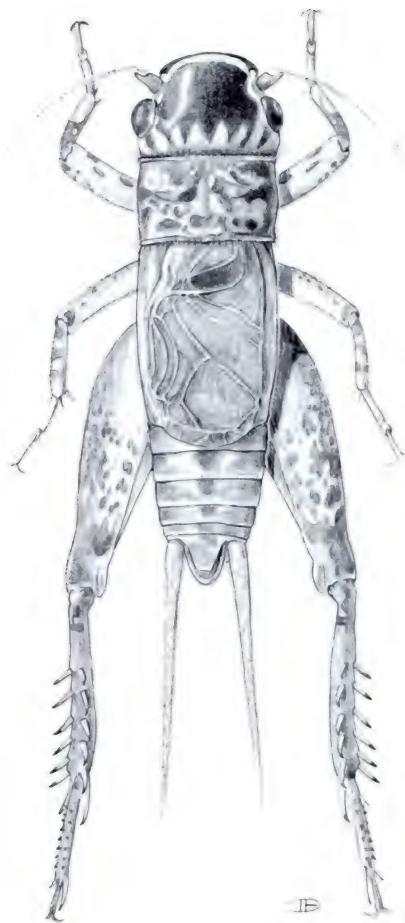
Chopard (1967) lists 33 species in this genus, 6 African, 1 Australian, and the rest from Asia and Pacific Islands, including 3 from the Philippines, 5 from Java (4 of them from Sumatra), and one from Mentawai, Sumba, and Timor. We add 1 species.

There seems to be no reason to doubt that *L. pallens*, one of two Australian members of this genus, is congeneric with *L. equestris*. Saussure's (1877) figures of the side view of the head and pronotum, face and dorsal head, pronotum, and tegmina match our species closely, and will key out in our generic key. At the same time, the male genitalia and body coloration of both Australian species are very similar to those of Australian *Comidogryllus*, so similar that were it not for the flattened faces in males we would place them into that genus. And *L. nurroo* appears to us to be precisely intermediate in face shape between *L. pallens* and *Comidogryllus*. In both of these genera the face is undercut and we wonder if flattened faces might not evolve repeatedly in crickets. If they do, perhaps in association with fighting or burrow-defense, then the various genera with names ending in *blemmus* could be unrelated. It is a matter worth exploring further.

RECOGNITION. Male genitalia (of Australian species) very similar to *Comidogryllus*. Face with distinct white streak running between lateral ocelli. Face of males flattened (strongly flattened in *L. pallens*, mildly so in *L. nurroo*). Occiput with horizontal pale streaks. Pronotal disk mottled. Legs pale with dark markings, spots, and streaks. Ovipositor little shorter than femur III. Tympana on outer face only.

pallens

1. Face strongly flattened in males (Fig. 55A).
2. Male genitalia as in Fig. 64C.
3. Scape of male with distinct lateral projection (Fig. 64H).

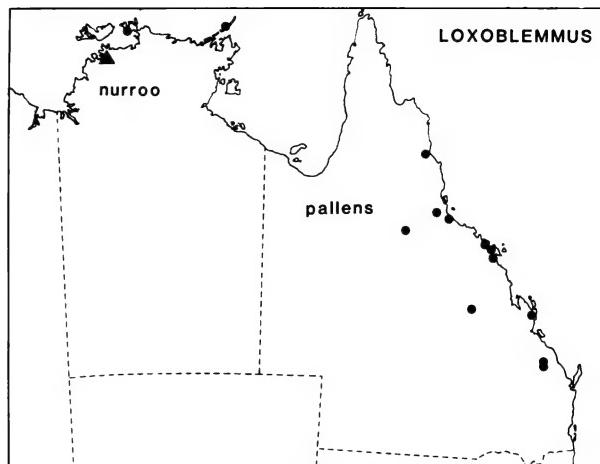
FIG. 62. *Loxoblemmus pallens*.*nurroo*

1. Face slightly flattened in males (Fig. 55B).
2. Male genitalia as in Fig. 64D.
3. Scape of male without lateral projection.

Loxoblemmus pallens (Serville), Figs. 62, 64ABCEFH

Gryllus pallens Serville 1839: 344. Holotype ♀, Nlle Holland, PM. Transferred to *Loxoblemmus* by Chopard 1951.

RANGE. Eastern QLD and extreme northern NT.
RECOGNITION. Males: Face, flat and slanting backwards ventrally. Scape with lateral projection. In color very similar to *Comidogryllus* species. Tympana on outer face only. Top of head with white band running along front margin and between lateral ocelli. Occiput with longitudinal pale stripes.

FIG. 63. *Loxoblemmus* distributions.

Pronotal disk variegated dark brown and ivory. Lateral lobes dark brown in upper half, and with pale band along lower margin; edges of lateral lobes dark. FW not reaching end of abdomen, with mirror and with 2 harp veins. Mirror usually not divided as in Fig. 64EF, but sometimes partially divided. All three femora and tibiae I and II pale with dark spots. Tibia III with 5 inner and 5 outer subapical spurs. Genitalia as in Fig. 64C. Body length ca. 14.5 mm.

Females: Face not nearly as flattened as in males, more rounded as in *Comidogryllus* species (Fig. 55J). Scape of antennae without lateral projection. Forewings slightly longer than pronotum and barely overlapping medially at rear edge of pronotum. Ovipositor longer than tibia III but shorter than femur III.

SONG. Fig. 67. Produced at night and on rainy or cloudy afternoons; slow clear trill.

	p/s	kps	°C
A-33	10.6	4.35	22
A-477	12.7-13.2	4.4	28
A-490	10.6	4.1	22
A-493	13.5	4.5	27
A-494	13.6-15.9	4.4	28
A-517	9.9-10.2	4.0	24
A-518	12.4	4.3	24

HABITAT. Not found in burrows but under clods and stones in steep hillsides and grassy areas.

SPECIMENS. Holotype ♀ PM. A-33 3♂ ANC. A-496 1♂ UM. A-506 1♂ ANSP. A-517 2♂ ANC. QUEENSLAND: Cannonvale, 1

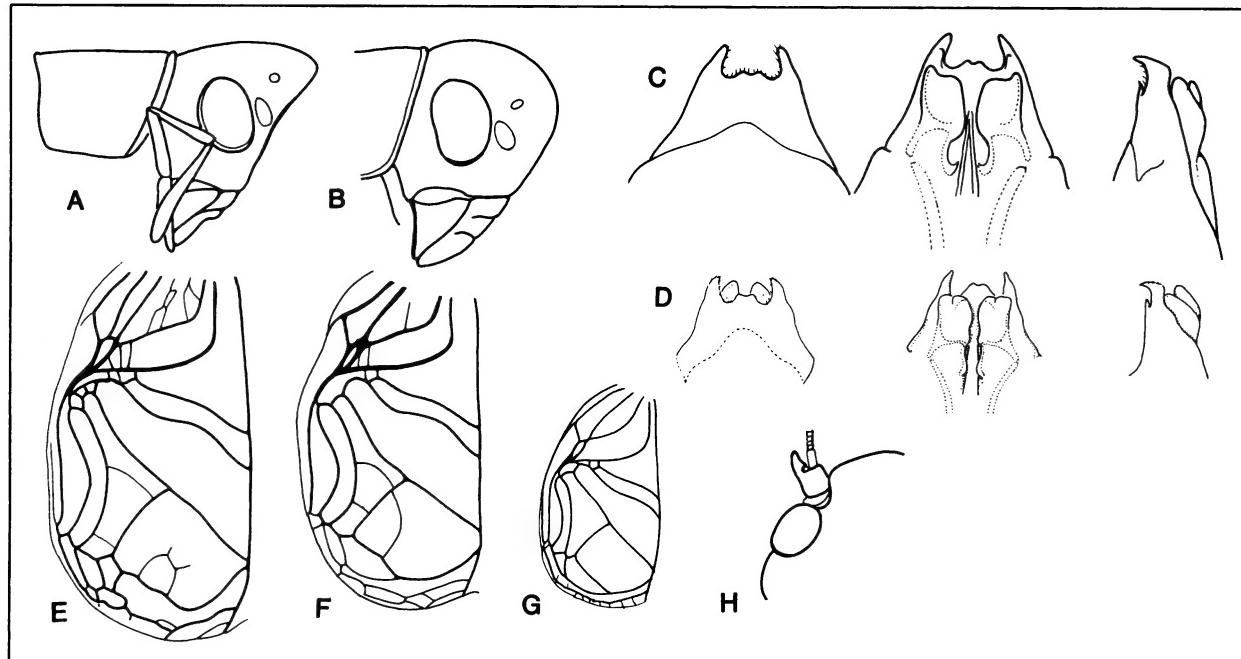


FIG. 64. *Loxoblemmus*. A, *pallens* ♂; B, *pallens* ♀; C, *pallens* male genitalia (dorsal, ventral, lateral); D, *nurroo* genitalia; E, *pallens* Cobourg Peninsula; F, *pallens* A-517; G, *nurroo* A-142; H, *pallens* ♂ scape.

iv 1967 (Upton) 1 ♂ ANC. Byfield, 22 i 1961 (Common) 1♀ ANC. NORTHERN TERRITORY: 11.01S 136.45E, Rimbija Isl, Wessel Isls, 8 ii 1977 (Weir) 1♀, 10 i 1977 (Edwards) 1♀, ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 22 ii 1977 (Weir) 4♂ 14♀ ANC.

Loxoblemmus nurroo n. sp., Figs. 55B, 64DG

RANGE. Type locality in northern NT.

RECOGNITION. Generic placement uncertain; resembles both *Comidogryllus* and *Loxoblemmus*. Head of males not as strongly angulate or flat as in males of *L. pallens*; head of female somewhat more angulate than that of *L. pallens* females. Pronotum banded as in Fig. 55B. Face flattened or slightly concave. Front of head with white band connecting lateral ocelli; band becomes very thin in central section. Last segment of maxillary palpi brown, preceding segments pale. Side of head and pronotum as in Fig. 55B. Inner tympanum very small, scarcely distinguishable, outer tympanum large, oval. FW venation as in Fig. 64G. File with 102–110 teeth ($n=3$). Legs pale in background but rather strongly spotted. Dorsum of abdomen banded; distal margin of each tergite pale. Cerci pale but with dark hairs.

Genitalia as in Fig. 64D. Holotype measurements: Body length 11.5 mm, FW 4.6 mm, femur III 6 mm, tibia III 3.5 mm, cerci 6 mm. File with 102 teeth.

Females: Coloration generally similar to male. FW small, rounded posteriorly and barely overlapping medially. FW 1.48 times as long as pronotum. Top of abdomen rather pale medially and speckled. Ovipositor 2.86 times as long as pronotum. Body length ca. 12 mm; FW ca. 3 mm, femur III ca. 6.3 mm, tibia III ca. 4 mm, ovipositor ca. 6 mm, cerci ca. 6 mm.

HOLOTYPE. ♂, A-142, Berry Springs, near Darwin, NT, 17 ix 1968, ANC.

SONG. Fig. 67. Series of trills at rate of about 35 p/s. Breaks between trills momentary and trills about 3 seconds long.

	p/s	kps	°C
A-142	34.5	6.0	25

HABITAT. In leaf litter along bank near water.

SPECIMENS. Holotype ♂ ANC. A-142 4♂ 4♀ ANC, 1♂ ANSP.

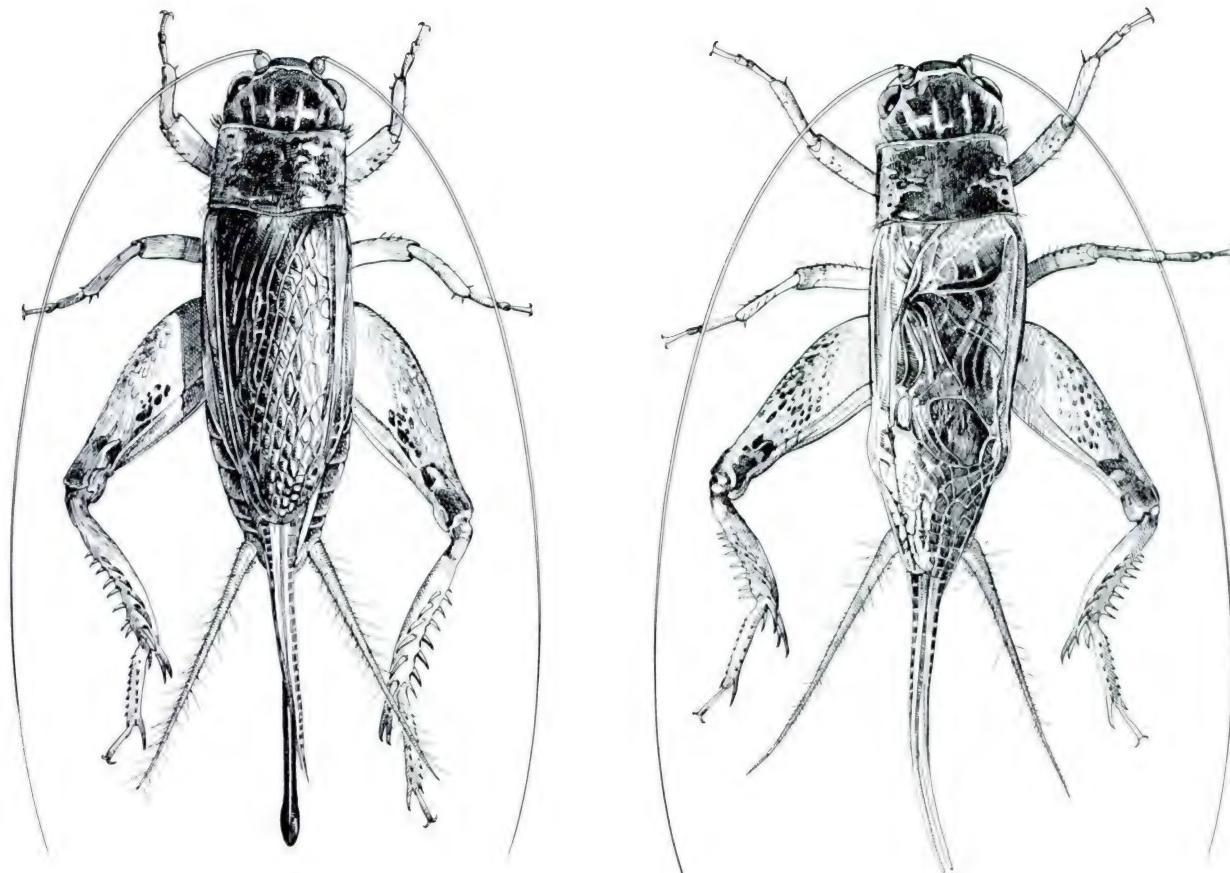


FIG. 65. *Lepidogryllus parvulus*.

LEPIDOGRYLLUS n. gen.

TYPE SPECIES. *Lepidogryllus parvulus* (Walker).

Collectively, these crickets are among the most prominent and frequently collected forms in Australia. Both species are widely distributed across the continent, and the two are always found in the vicinity of waterholes or along rivers, and thus belong ecologically to Key's (1959) "drought-avoiding" category. Both species are frequently macropertorous. Crickets that probably belong to this genus are also known from New Guinea, Java, Borneo, and New Caledonia.

Members of the genus *Lepidogryllus* appear to be B₂ chirpers (Alexander 1962). By this it is meant that their fast pulse rates, long chirps, and slow

chirp rates indicate that chirp length and spacing have become the significant features of their song.

RECOGNITION. Fig. 65. This genus possesses following combination of characteristics: Genitalia with wide U-shaped epiphallus (Fig. 68). Top front of head with white stripe connecting lateral ocelli. Disk of pronotum mottled in appearance, generally paler along lateral margins (Fig. 55N). Top of face with large pale medial streak beginning at median ocellus and running ventrally to clypeus. Outer tympanal opening large and oval, inner tympanum absent or obscure, represented at most by indistinct depression. Side of pronotum dark on top and pale in bottom half (Fig. 55N). Legs I and II pale and with at most indistinct light brown markings. Mirror complete and divided. Harp with two veins.

The two species in this genus are almost indistin-

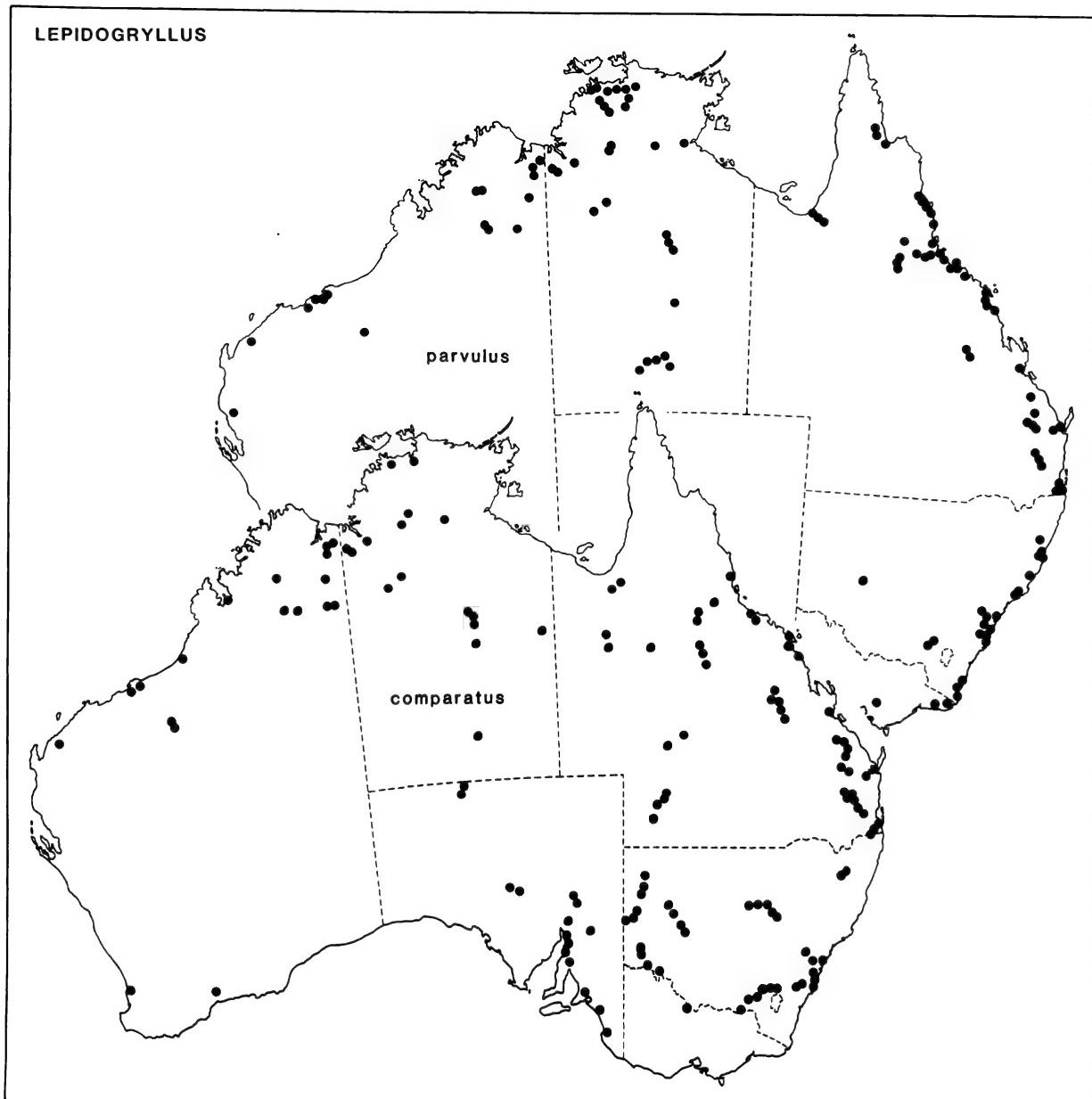


FIG. 66. *Lepidogryllus* distributions.

guishable morphologically although there is a slight difference in the number of file teeth. The females are presently not distinguishable and must for the most part be associated with males. The slight difference in distributional pattern may also aid in identification.

parvulus

1. Song consists of short, very fast pulse chirps.
2. File with 97 to 128 teeth ($\bar{x} = 112.5$).

comparatus

1. Song consists of long chirps or short trills with very fast pulse rate.
2. File with 108 to 143 teeth ($\bar{x} = 125.5$).

Lepidogryllus parvulus (Walker) Figs. 65, 68AC

Gryllus parvulus Walker 1869: 43. Holotype ♀, South Australia, BM. Type examined.

Gryllus lineiceps Walker 1869: 44. Holotype is a juvenile female without a locality label, BM. Chopard 1951: 412 synonymy. Type examined.

Gryllus lepidus Walker 1869: 46. Holotype ♀, South Australia, BM. Transferred to *Gryllulus* by Chopard 1951: 411. Type examined. NEW SYNONYM.

Gryllus kimberleyensis Mjöberg 1913: 32. Holotype ♂, Kimberley Dist., N. V. Australia (Mjöberg) sm. Synonym of *Gryllulus lepidus* Chopard 1951: 411. Type examined. NEW SYNONYM.

RANGE. Widespread in Australia, but more abundant about the northern and eastern periphery.

RECOGNITION. Males: Body color brown and ivory, legs pale. Top of head and pronotum patterned as in Fig. 55LM. Side of head and pronotum patterned as in Fig. 55N. Face patterned as in Fig. 55R. Palpi pale. Head width 0.89 times greatest width of pronotum. Greatest pronotal width 1.70 times pronotal length. FW generally pale brown, darker brown in basal and chordal areas. File with 105 teeth. HW extending beyond the cerci. Legs I and II generally pale and with dark brown setae on top. Distal ends of femora I and II with brown ring. Proximal end of tibia I and II brownish. Brown pigmentation on tibia I most pronounced around outer tympanum. Inner tympanum small, oval, and rather indistinct. Outer tympanum very large and oval. Tarsi I and II pale, ventral surface of basal segment with stout regularly spaced brown setae. Femora III with oblique rows of brown spots on top external face (running in a top-front to bottom-posterior direction); top inner face with larger brown markings as in Fig. 65. Tibia III with 6 inner and 6 outer subapical spurs. Venter of abdomen pale. Subgenital plate brown on sides. Cerci pale but with a covering of short brown setae. Genitalia as in Fig. 68A. Body length ca. 18 mm, femur III ca. 11 mm, tibia III ca. 7.5 mm, FW ca. 12 mm, cerci 10 mm.

Females: Macropterous. Similar to males in size or slightly larger. Ovipositor (A-767) about equal in length to femur III.

VARIATION. In some areas individuals may be quite reddish in appearance while in others the head and pronotum may be quite dark. The long stripe on the back of the head also may vary considerably in thickness and brightness.

Following is a list of localities at which macropterous individuals were found and the number of file teeth in males taken at those localities: A-7 (105, 105, 127 teeth); 10 (103); 24 (108, 123); 26 (110); 28 (97, 104, 106, 110, 115, 119); 79 (106); 91 (118); 130 (103, 105, 113); 135 (125); 139 (111); 141 (108, 112); 255 (107); 300 (111, 118, 121); 309 (128);

344 (113); 425 (113); 704 (113); 713 (115); 767 (124); 780 (117); 894 (116).

SONG. Fig. 67. Repeated short chirps (under 0.5 seconds) with very fast pulse rate. Quality of sound resembles that of *L. comparatus*. Groups of 5 or 6 chirps sometimes produced, then long silent interval before next group.

	pulse rate	chirp rate	no. pulses		
			per chirp	kps	°C
A-4 n=4	123-140	3.4-4.2	14-17	4.1-4.2	22
A-10 n=2	100	3	12-16	3.6	14
A-16	110-117	6.3	19-22	4.3-4.7	18
A-17	111	3.6		3.9	20
A-28 n=2	150, 151	4.3, 4.9	13-19	4.3, 4.5	18
A-26	110	3.0	15	4.4	18
A-24-25	80	2.0	11-13	4.2	24
A-28 n=2	120, 145	3.2, 4.2	16	4.9	18
A-33	105	3.7	11	4.3	22
A-41 n=2	127, 133	4.3, 4.4	10, 15	4.2, 4.7	21
A-64	104	5.6	11	4.8	21?
A-88	100	2.3	19-21	4.0	23
A-91 n=2	104, 105	2.2, 2.6	13, 14	4.5, 4.7	22
A-127	130	1.5	16	4.6	28
A-130	193	5.2	15-18	4.9	27
A-135	170	3.5	18-20	4.9	28
A-141	170		17-20	4.9	22
A-166	145-150	3.5	14-23	4.8-4.9	29
A-189 n=2	179, 188	4.7	17	4.8	29
A-256 n=2	160, 180	4.1	16, 17	4.5	24?
A-268 n=2	126, 130	4.4, 4.5	13, 14	4.0	20
A-269 n=3	105-112	4.0-5.3	15-16	3.7	21
A-286	172	4.8	16-18	4.5	24-27
A-293	138	4.7	12-13	4.75	18
A-301	150	5.1	13	4.8	30-32
A-308	150	2.2	12	4.2	16
A-344 n=2	125, 128	3.1, 3.9	11, 12	4.5	20
A-352	94.3	2.8	12	4.1	21
A-425 n=2	145	5.1, 5.3	10, 12	4.4	22
A-477	164		12	4.8	28
A-498	143	4.6	11	5.3	21
A-507	96.5	4.6	10-11	7.3	26
A-529	125	4.1	11-12	4.5	19
A-540	110	3.4	12-14	4.5	21
A-583	98	2.9	12-13	4.6	18
A-704	133	1.7	21	4.0	20
A-767 n=3	147-190	3.8-5.0	13-19	3.9-4.7	23
A-831	250	2.5	20	4.5	22

HABITAT. Along roadsides, river beds, around billabongs, and in moist swales. In the interior usually associated with water holes and river beds.

SPECIMENS. We have examined several hundred specimens from a number of museums. In most cases it is not possible to

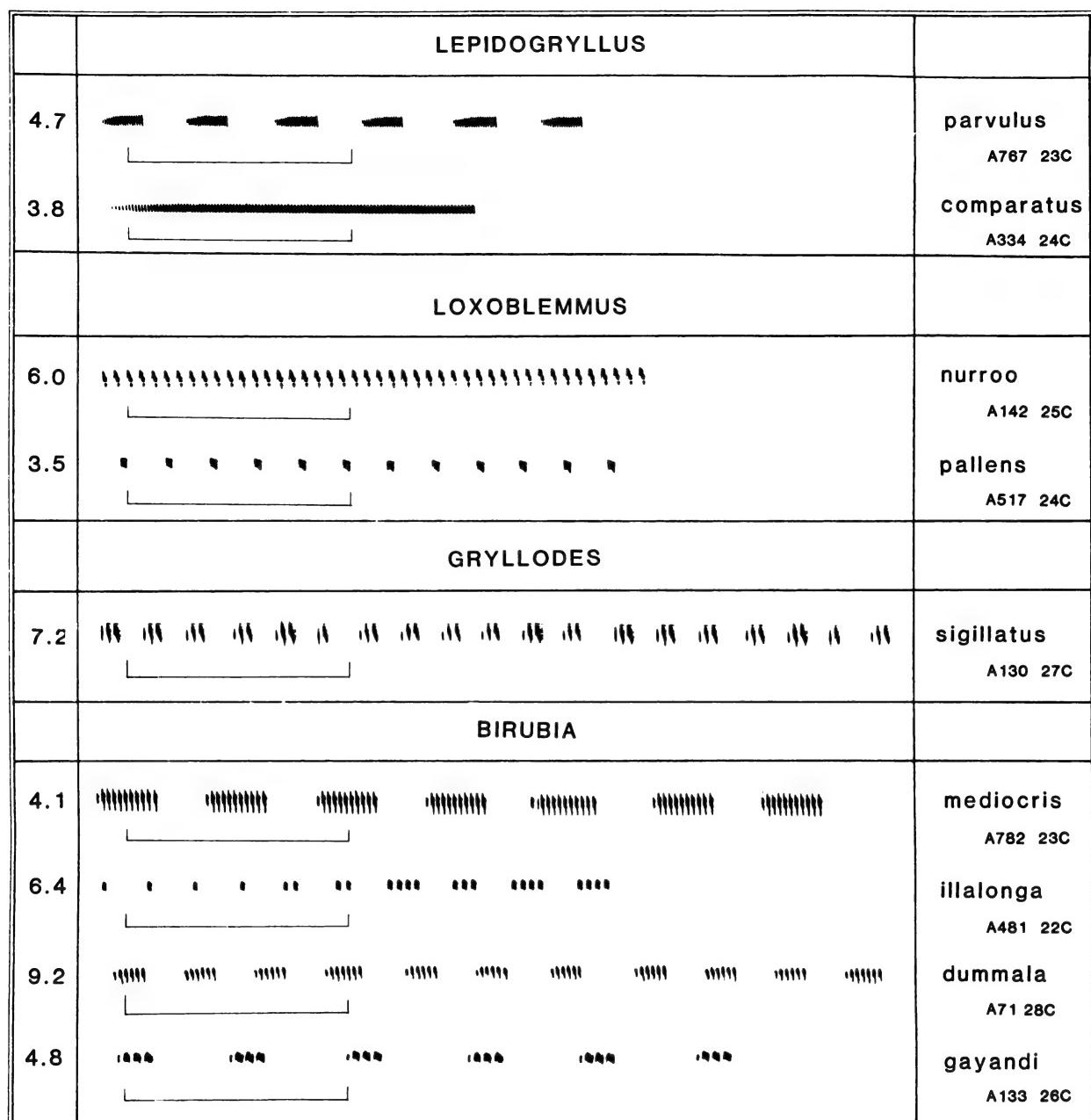


FIG. 67. Songs of *Lepidogryllus*, *Loxoblemmus*, *Gryllodes*, and *Birubia* species. Scale = 0.5 s.

separate *L. parvulus* and *L. comparatus*. We have therefore not plotted museum specimens.

Lepidogryllus comparatus (Walker) Fig. 68B

Gryllus comparatus Walker 1869: 44. Type ♂, Australia, BM. Type examined.

RANGE. Very widespread, and more common in the interior than *L. parvulus*.

RECOGNITION. Males: Reliably distinguished from *L. parvulus* only by song. Head banded as in *L. parvulus*. Venation as in *L. parvulus*. HW short and hidden beneath FW, or long and extending well

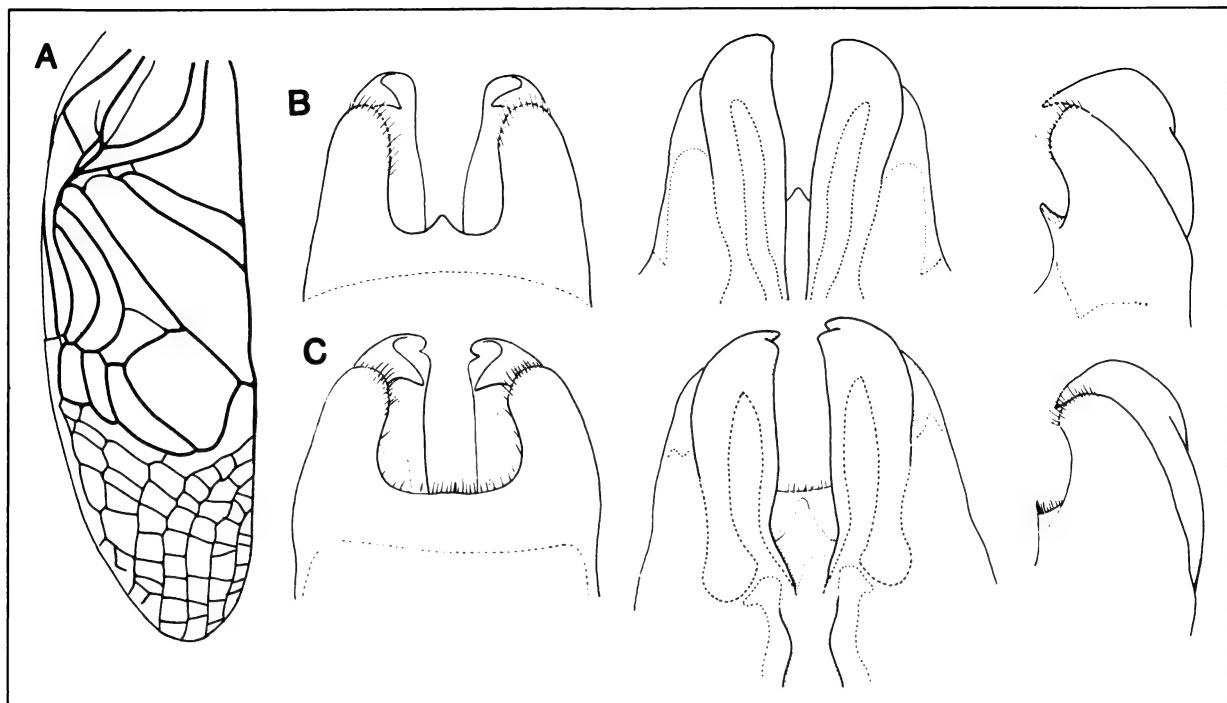


FIG. 68. *Lepidogryllus*. A, *parvulus* A-7; B, *comparatus* genitalia (dorsal, ventral, lateral); C, *parvulus*.

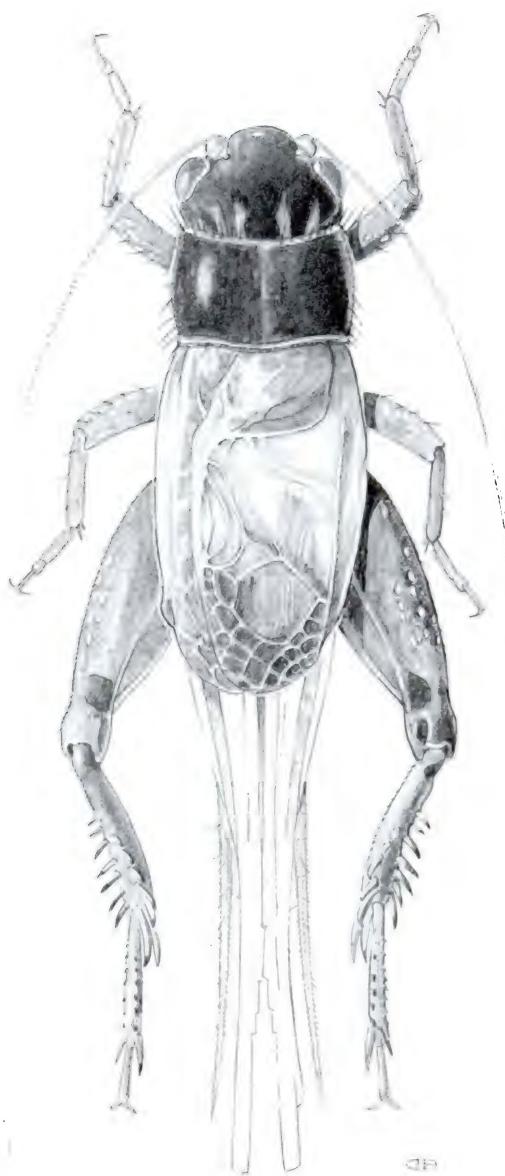
beyond end of abdomen. Legs, abdomen, and cerci as in *L. parvulus*. Genitalia as in Fig. 68B. Body length ca. 17 mm; FW ca. 8 mm; femur III ca. 9.5 mm; tibia III ca. 7 mm; cerci ca. 9 mm.

Females: Macropterous. Ovipositor ca. 1.2 times as long as femur III and 4.3 times as long as pronotum. Body length similar to males. Tibia III usually with 6 inner and 6 outer subapical spurs.

VARIATION. As in *L. parvulus* both macropterous and micropterous individuals were found. The variation in the number of file teeth and tooth spacing is given below. In South Australia (A-375, A-376, and A-403) this species was found under fleshy-leaved shrubs on salt flats. These specimens were at first thought to belong to a new species because they were considerably smaller and much paler. We found individuals with short HW's only at A-3, A-7, A-305, and A-654. File counts from across the country are as follows: A-3 (111, 130 teeth); 7 (121, 126); 91 (110); 141 (128); 187 (110); 305 (108, 109); 325 (125, 126, 131); 335 (135); 336 (111, 122, 126, 135); 338 (137); 362 (134); 380 (137); 430 (119, 120); 434 (120); 454 (127, 136, 136, 133, 142, 126); 470 (129); 472 (126, 137); 440 (124); 538 (120); 654 (110); 774 (127).

SONG. Fig. 67. Long chirps lasting from 0.5 to 1.8 seconds and repeated every 4–5 seconds. Pulse rate extremely fast. Neighboring individuals seemed at times to alternate chirps.

		p/s	trill length	kps	°C
A-3	n=3	83–114	1.45	3.3–3.5	18
A-4		130–160	0.55–0.74	4.3	22
A-4		130	0.67	4.4	22
A-4		156	0.74	4.5	22
A-91	n=2	92, 96	1.1	3.9, 4.0	18
A-134		140	0.81	5.5	36
A-141		164	0.68	5.5	22
A-166		150	0.74	4.0	30
A-172	n=2	170, 176	0.5	3.9	24
A-258		197	0.51	3.9	24
A-294		113		3.4	18
A-325		136	0.98	3.8	23
A-334		135	0.83	3.8	24
A-339		100		3.5	16
A-347		120		3.8	22
A-362		150		3.8	22
A-371		88–90		3.8–4.0	18
A-375		90–130	0.59	3.8–4.7	18
A-374		138	0.84	3.85	18
A-434		135–142		3.9–4.1	23
A-481	n=2	160, 170	0.97	3.9, 4.3	22

FIG. 69. *Birubia illalonga*.

	p/s	trill length	kps	°C
A-496	165	0.57	4.2	26
A-538	131	0.92	4.0	24
A-654 n=3	91-93	1.13-1.25	3.6-3.7	21
A-713	133	0.74	4.0	26
A-760	75-80	0.83-0.91	4.7	19
A-774	153	1.17	5.3	25
A-831	63.5-66.5	1.56	3.5	22
A-675	94-100	0.55-0.61	4.5	18

HABITAT. Characteristically found around water-holes; most abundant where soil cracks are evident. Often flies to lights.

SPECIMENS. See *L. parvulus* specimens and Fig. 66.

BIRUBIA n. gen.

TYPE SPECIES *Birubia mediocris* (Mjöberg).

This genus is known only from northern Australia. The four included species usually inhabit moist grassy swales and are often found in roadside ditches and depressions where they sing only at night.

RECOGNITION. Members of this genus possess following combination of characteristics: Forelegs with tympana on outer face only. Genitalia with prominent median lobe (Fig. 71). Back of head usually with 6 longitudinal pale stripes. Top front of head without white band connecting the lateral ocelli. Top of head and pronotum usually dark reddish brown. Disk of pronotum not mottled, about the same color as head. Lateral lobes as dark as pronotal disk. Male body length 12 mm or less and femur III length 7 mm or less. Legs generally pale and not strongly spotted, speckled, or banded (spotted and patterned in *Comidogryllus*). FW's with 2 harp veins (Fig. 71G). Mirror complete and undivided.

mediocris

1. Occiput with 6 longitudinal pale stripes.
2. Lateral lobes of pronotum same color as disk.
3. File with 72-89 teeth (n=5).
4. Genitalia as in Fig. 71A.

dummala

1. Occiput with 6 longitudinal pale stripes.
2. Lateral lobes of pronotum same color as disk, but front margins of lateral lobes pale.
3. File with 113, 116 teeth (n=2).
4. Genitalia as in Fig. 71D.

illalonga

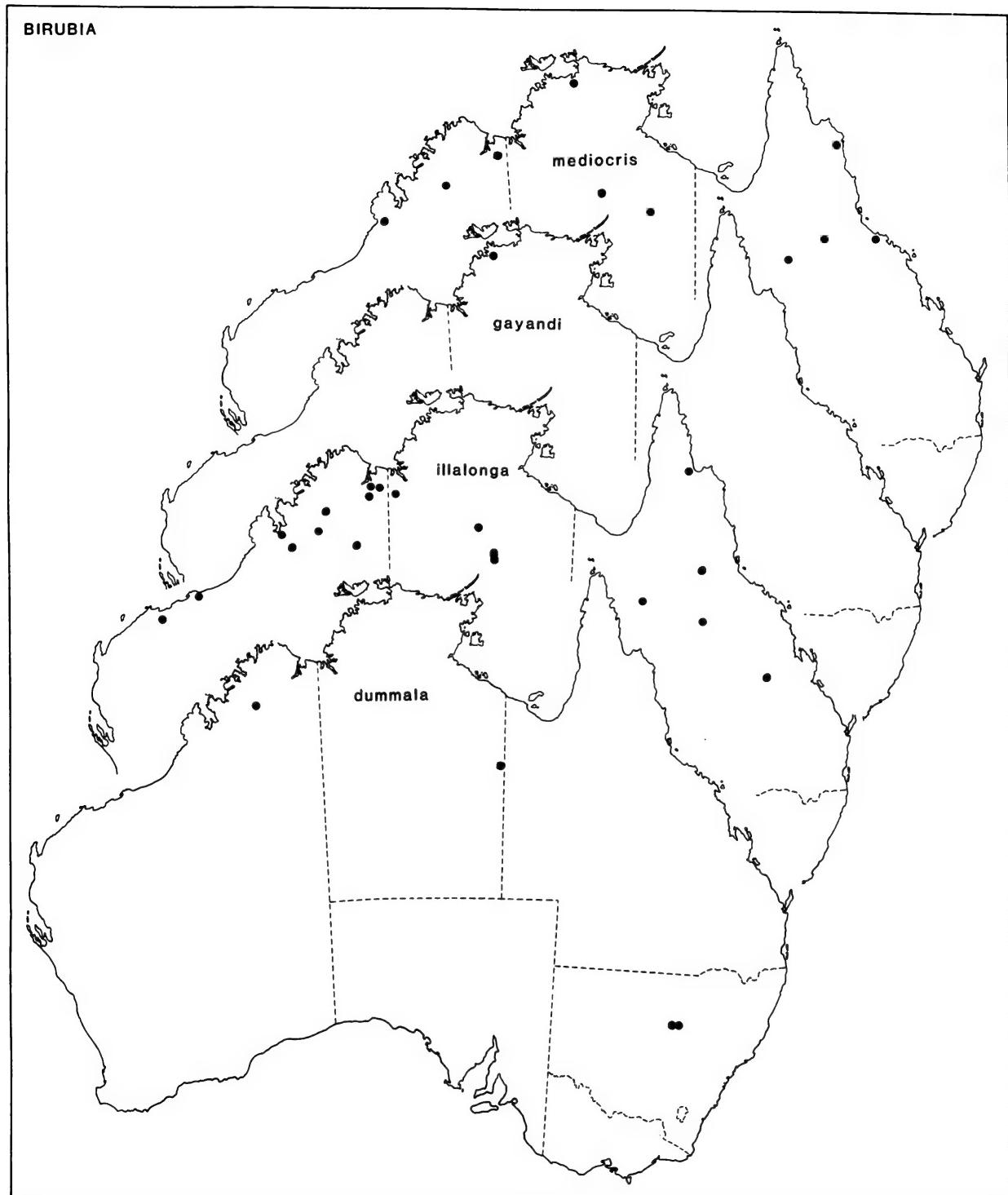
1. Occiput with 6 longitudinal pale stripes.
2. Lateral lobes with pale band along bottom.
3. File with 103-127 teeth (n=13).
4. Genitalia as in Fig. 71B.

gayandi

1. Occiput not striped.
2. Lateral lobes.
3. File with 136 teeth (n=1).
4. Genitalia as in Fig. 71F.
5. Pronotum rather hairy.

Birubia mediocris (Mjöberg), Figs. 55D, 71AG

Grylloides mediocris Mjöberg 1913: 33. Holotype ♂, Kimberley district, Northwest Australia (Mjöberg) sm. Transferred to

FIG. 70. *Birubia* distributions.

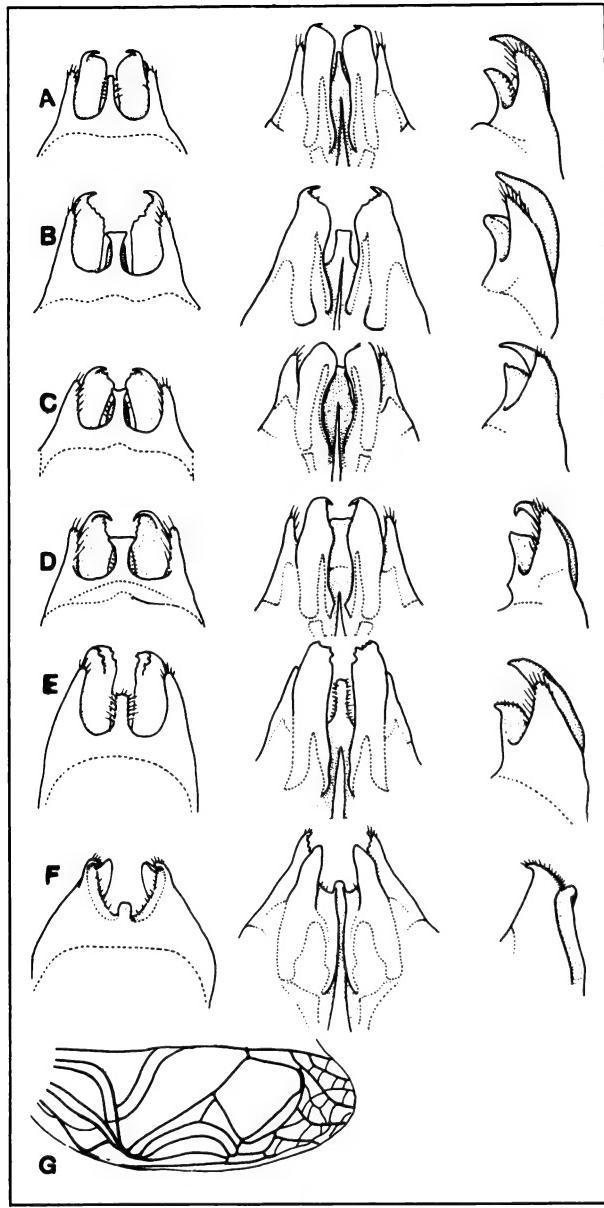


FIG. 71. *Birubia* male genitalia (except E) (dorsal, ventral, lateral): A, *mediocris* A-55; B, *illalonga* A-39; C, *illalonga* A-172; D, *dummala* A-334; E, *Buangina bogabilla*; F, *gayandi* A-133; G, *mediocris* A-55.

Gryllus by Chopard 1925: 19. Transferred to *Gryllulus* by Chopard 1951: 418. Transferred to *Modicogryllus* by Chopard 1968: 87. Type examined. NEW COMBINATION.

Gryllulus kempfi Chopard 1951: 418. Holotype female, Norman-ton, QLD, AM. Type examined. NEW SYNONYM.

RANGE. Northern quarter of the continent.

RECOGNITION. Males: Top of head reddish-

brown. Back of head with 6 longitudinal stripes, and very thin medial line (coronal suture). Palpi pale. Face and cheeks reddish. Head slightly narrower than greatest pronotal width. Pronotum nearly unicolorous brown (sometimes very slightly blotched in appearance). Lateral lobes as dark as disk. Pronotum width 1.64 times its length. Front of pronotum almost as wide as back. File with 72–89 teeth. FW extending just beyond middle of abdomen. HW not visible. Wing venation as in Fig. 71G. FW 2.83 times as long as pronotum. File with 72–89 teeth. Legs yellowish, femur III reddish on top and distally. Tibia III with 5 inner and 5 outer subapical spurs. Top of basitarsus III with 7 outer and 6 inner spines. Abdomen reddish on dorsum and pale on venter. Subgenital plate darker than preceding segments. Genitalia as in Fig. 71A. Body length ca. 12 mm; femur III ca. 7 mm, tibia III ca. 5 mm.

Females: Very similar to males. FW's extending to about middle of abdomen and about 2.7 times as long as pronotum. Ovipositor about 3.0 times as long as pronotum. Body length ca. 13 mm; femur III ca. 7 mm.

VARIATION. File counts for this species are as follows: A-55 (89, 72 teeth), 141 (81), 477 (86), 67 (72). In a male from A-141 the apical area of the FW is about $\frac{1}{3}$ as wide as the mirror. A male from A-67 is macropterous with HW extending well beyond the abdomen.

SONG. Fig. 67. Succession of chirps containing 9–12 pulses.

	p/s	ch/s	p/ch	kps	°C
A-55	74	4.4	10	5.6	19
A-782	77	4.1	11–12	6.3	23
A-141	72	4.4	8	7.6–7.9	22
A-141	85	3.9	10–11	6.6	22

HABITAT. Moist grassy depressions along streams and roadsides and other seepy areas.

SPECIMENS. Holotype ♂ SM. A-53 2♂ 1♀ ANC. A-55 1♂ 1♀ ANSP. A-67 1♂ 1♀ ANC. A-141 1♂ ANC. A-477 1♂ ANC. A-782 1♂ UM. NORTHERN TERRITORY: Newcastle Waters, 3 vi 1929 (Campbell) 1♂ ANC. Burnette Downs, 10 v 1947 (Stewart) 1♂ ANC. 17.29S 133.30E, 8 km NNW Elliott, 14 x 1972 (Upton) 1♂ ANC. WESTERN AUSTRALIA: 25 mi ESE Broome, 16 iv 1963 (Chinnick) 1♀ ANC. Kimberley Res. Sta. via Wyndham, 28 i 1955, 2♂ 1♀, 22 iii 1955 (Lanfield) 1♀ ANC.

Birubia dummala n. sp., Fig. 71D

RANGE. Collected or taped at widely scattered sites in WA, NT, and NSW.

RECOGNITION. Males: Body color dark reddish-brown. Back of head with 5 prominent pale stripes. Coronal suture forming fine pale line. Pronotal disk with two indistinct pale marks in posterior half—one on either side of median line. Face and cheeks reddish-brown. Palpi white. Lateral pronotal lobes as dark as disk, but with pale front margin. File with 113, 116 teeth (n=2). Tibiae I and II generally pale but reddish at base. Femur II with larger brown markings near distal end. Femur III with oblique rows of reddish spots on top outer face and mostly reddish in last quarter. Tibia III with 5 outer and 4 inner subapical spurs. Basitarsus III with 7 inner and 7 outer spines. Abdomen reddish-brown on dorsum, pale on venter. Subgenital plate brownish. Genitalia as in Fig. 71D. Body length ca. 11 mm. Holotype measurements: Head 0.9 times as wide as pronotum; FW 3.1 times as long as pronotum. File with 116 teeth. Body length 11 mm; FW length 5.5 mm; femur III 5.9 mm; tibia III 4.0 mm.

Females: Colored as in male. FW not quite reaching middle of abdomen. Body length ca. 13 mm; FW ca. 5.5 mm; femur III ca. 7 mm; tibia III ca. 4.5; ovipositor ca. 4.3 mm; cerci ca. 6.5 mm.

VARIATION. A male from A-71 lacks reddish marks on the base of tibiae I and II, the genitalia are somewhat different and he has 113 file teeth.

HOLOTYPE. ♂, A-334, 4 miles west of Nyangan, NSW, 28 xii 1968, ANC.

SONG. Succession of chirps containing 6 or 7 pulses.

	p/s	ch/s	p/ch	kps	°C
A-71	76	6.0	6-7	9.2	28
A-334	64	5.0	7	7.6	21
A-782	72	4.2	6-7	8.3	28

HABITAT. Grassy areas next to river and moist depressions by roadsides.

SPECIMENS. Holotype ♂ ANC. A-71 1♂ ANC. A-334 2♀ ANC. A-335 3♀ ANC.

Birubia illalonga n. sp., Figs. 55E, 69, 71BC

RANGE. Northern quarter of WA and northern half of NT and QLD.

RECOGNITION. Males: Similar to *B. dummala* but differing as follows: Lower side of lateral lobes with pale band just above dark edge, upper side of femur III mostly reddish-brown, not as spotted; FW with very narrow apical area (about one cell layer wide behind mirror); file with 103–127 teeth. Genitalia as in Fig. 71BC. Body length ca. 11 mm. Holotype measurements: File with 124 teeth. Body length 11 mm; femur III 7 mm; tibia III 5 mm; FW length 4.5 mm; cerci ca. 7.0 mm.

Females: Coloration similar to males. FW not extending much beyond 1st abdominal segment. FW ca. 1.3 times as long as pronotum. Ovipositor ca. 1.7 times as long as pronotum. Body length ca. 11 mm; femur III ca. 11 mm; tibia III ca. 4.5 mm; ovipositor 3.7 mm.

VARIATION. One male from A-39 is pale reddish-brown, another is dark reddish-brown. File count varies as follows: A-782 (124 teeth); 85 (103, 113); 179 (113); 767 (118, 125); 905 (111); 69 (113, 125); 103 (127); 177 (116, 126); 470 (110); 510 (122).

HOLOTYPE. ♂, A-782, 4 miles NW of Mount House, WA, 15 v 1969, ANC.

SONG. Fig. 67. Groups of 10–15 chirps in which first chirps have fewer pulses than last. Male from A-39 produced following song (numbers indicate number of pulses in chirp): 1, 1, 1, 1, 1, 1, 1, 2, 2, 3, 3, 3, 4, 4. Second song: 1, 1, 1, 1, 1, 2, 2, 3, 3, 3, 3, 4. At A-767: 2, 3, 3, 4, 4, 4, 4, 4, 4, 4, 4. At A-69 as many as 18 chirps per group, with most chirps containing 4 pulses.

	p/s	ch/s	p/ch	kps	°C
A-39	40	5.6–6.3	1–4	6.3	21
A-69	47	6.2	4	6.7	28
A-104	43	6.1	1–4	6.1	23
A-417	65	7.4	4–5	6.7	26
A-481	45	6.6	1–4	6.4	22
A-767	53	6.8	2–4	6.4	23
A-782	55	6.5	1–5	6.4	23
A-803	55	7.2	1–4	6.5	27
A-821	50	7.0	1–4	6.2	24

HABITAT. Moist grassy swales and depressions. At A-69 a colony found among rocks.

SPECIMENS. Holotype ♂ ANC. A-39 2♂ 1♀ ANC. A-69 2♂ ANC. A-103 1♂ ANC. A-172 2♂ ANC. A-179 1♂ UM. A-470 1♂ 1♀ ANSP. A-510 1♂ 1♀ ANC. A-767 2♂ ANC. WESTERN AUSTRALIA: 51 mi ENE Port Hedland, 18 iv 1963 (Chinnick) 1♂ ANC. Jones R., 16 mi ESE Roebourne, 20 iv 1963 (Chinnick) 1♂ 4♀ ANC. Myrooda Crossing, Fitzroy R., 28 v to 6 vi 1961 (Gup-

py) 1♂ ANC. Kimberley Res. Sta. via Wyndham, 16 x 1956 (Langfield) 1♀ ANC. NORTHERN TERRITORY: Newcastle Waters, 4 vi 1929 (Campbell) 1♀ ANC.

LISTENING RECORD. A-181.

Birubia gayandi n. sp., Fig. 71F

RANGE. Type locality in Darwin area.

RECOGNITION. Males: Very similar to *B. illalanga*, *B. dummala*, and *B. mediocris*, but differing as follows: Back of head without pale stripes; dorsum of pronotum hairy; legs I and II brown; femora I and II with numerous fine hairs; femur III almost unicolorous red-brown; tibia III with 4 inner and 5 outer subapical spurs. Basitarsus III very long (0.52 times tibia III length) and with 6 outer and 5 inner very small spines; cerci brown; genitalia as in Fig. 71F. Body length 11.5 mm; FW length 5 mm; femur III 6.5 mm; tibia III 4.5 mm; cerci 5.5 mm.

HOLOTYPE. ♂, A-133, Howard Springs, near Darwin, NT, 24 ix 1969, ANC.

SONG. Fig. 67.

	p/s	ch/s	p/ch	kps	°C
A-133	40	2.8-3.8	3-4	4.7	26

HABITAT. In cracks in drying water hole.

SPECIMENS. Holotype ♂ ANC.

BUANGINA n. gen.

TYPE SPECIES. *Buangina diminuens* (Walker).

This genus is distributed mainly in eastern and southeastern Australia where it occurs mainly along roadsides and open grassy fields. One species, *B. scutellata*, extends well into the dry interior of NSW and QLD. Another species tentatively assigned to this genus, *B. bogabilla*, is known only from near Darwin, NT. Both sexes appear to be flightless in most species except *B. scutellata*.

RECOGNITION. Dorsum of head with pale band running transversely between lateral ocelli. Tympanal openings on outer face only. Back of head with or without pale longitudinal stripes. Lateral pronotal lobes pale in bottom half or lower anterior corner and dark above. Genitalia (top view) with prominent central process. Legs I and II light brown to pale. Abdomen dark brown ventrally. Harp with 2 veins.

diminuens (VIC and E NSW)

1. Occiput with faint longitudinal stripes or no stripes.
2. File with 72-89 teeth.
3. Ovipositor 0.8-0.9 times as long as femur III.
4. Both sexes with invisible HW's.
5. Vertex of head not as in Fig. 55H.
6. Legs I and II mottled black on pale background.
7. Body length more than 10 mm.
8. Face not like *bogabilla*.

kittana (E QLD)

1. Occiput with stripes.
2. File with ca. 59 teeth.
3. Ovipositor?
4. Male with invisible HW's.
5. Vertex of head not as in Fig. 55H.
6. Legs I and II pale.
7. Small: body length less than 10 mm.
8. Face not like *bogabilla*.

bogabilla (N NT)

1. Occiput with stripes.
2. File with 123-150 teeth.
3. Ovipositor ca. 1.0 times as long as femur III.
4. Both sexes with invisible HW's.
5. Vertex of head not as in Fig. 55H.
6. Legs I and II: femora pale in proximal half.
7. Body length more than 10 mm.
8. Face with a large white spot surrounding median ocellus.

scutellata (interior of NSW and QLD)

1. Occiput without stripes.
2. File with ca. 86 teeth.
3. Ovipositor ca. 1.2-1.3 times as long as femur III.
4. Both sexes with long visible HW's.
5. Vertex with pale cross band as in Fig. 55H.
6. Legs I and II pale.
7. Body length more than 10 mm.
8. Face not like *bogabilla*.

nullaga (S NSW to SE SA)

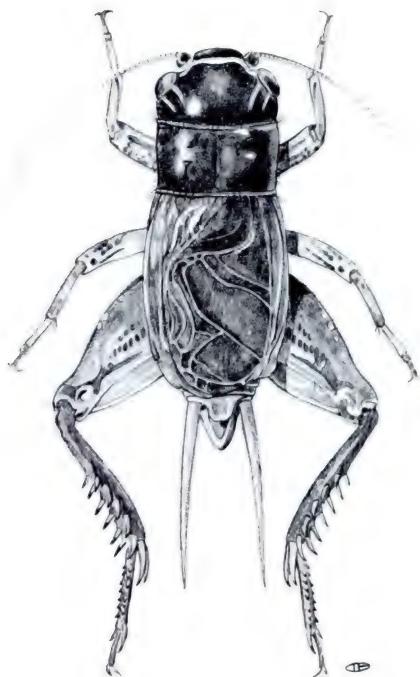
1. Occiput with horizontal stripes.
2. File with 69-97 teeth.
3. Ovipositor ca. 1.1 times femur III length.
4. Both sexes with invisible HW's.
5. Vertex of head not as in Fig. 55H.
6. Legs I and II pale.
7. Body length more than 10 mm.
8. Face not like *bogabilla*.

anemba (eastern NSW)

1. Occiput with horizontal stripes.
2. File with ca. 79 teeth.
3. Ovipositor?
4. Male HW's invisible.
5. Vertex of head not like Fig. 55H.
6. Legs I and II pale.
7. Body length more than 10 mm.
8. Face not like *bogabilla*.

urunga (SE QLD to NE NSW)

1. Occiput without longitudinal stripes.
2. File with 120-133 teeth.
3. Ovipositor length not known.
4. Male HW's invisible.

FIG. 72. *Buangina diminuens*.

5. Vertex of head not like Fig. 55H.
6. Legs I and II pale.
7. Body length more than 10 mm.
8. Face not like *bogabilla*.

***Buangina diminuens* (Walker), Figs. 72, 75A, 76A**

Gryllus diminuens Walker 1869, 1: 43. Holotype ♂, Tasmania, BM. Type examined. Transferred to *Gryllulus* by Chopard 1951: 415. Transferred to *Modicogryllus*, Chopard 1967: 87. Type examined.

Gryllus subniger Chopard 1951: 417. Holotype ♂, Avenue, South Australia, 29 ix 1949 (T. O. Browning) BM. Type examined. NEW SYNONYM.

RANGE. Along the Great Dividing Range from VIC to eastern NSW.

RECOGNITION. Males: Dorsum of body mostly black. Top of head with white stripe connecting lateral ocelli. Face mostly blackish. Side of head with pale mark below posterior-ventral margin of eye. Palpi mostly pale brown, but white at extreme end. Pronotal disk black. Lateral lobes mostly black, but pale along lower and anterior margins. FW brown on dorsal field, quite pale between Cu₁ and M veins

and very dark brown on lateral field between M and Sc. Files of three males from A-312 contained 72, 87, and 89 teeth. External faces of legs I and II mostly dark brown; internal surfaces mottled light and dark. Femur III mostly blackish on top and with wide oblique dark stripes over most of external face. Tibia III mostly blackish but with pale brown spurs. Basitarsus III with 8 outer and 5 inner spines. Cerci brown. Genitalia as in Fig. 75A.

Females: FW's slightly longer than pronotum to 1.6 times as long. In shorter winged females FW's barely overlap at pronotal edge. Ovipositor 0.8–0.9 times as long as femur III. Body length similar to males.

SONG. Fig. 74. Groups of 8 to 12 2-pulse chirps. Chirp groups separated by 1.2–1.5 second intervals. Whittlesea, VIC, male sang one group per second and 16 chirps per group at 21°C. Male near Fort Fairy, VIC, sang 11 chirps/group and 6 groups in 10 seconds at 13°C.

	p/s	ch/s	p/ch	number of chirps/ group	kps	°C
A-312	40	11.8	2	8–12	3.0	11
A-316	77	26.3	2	10–16	3.9	21
A-318	67	16.4	2	13		14
A-360	50	16.7	2	13	3.5	14

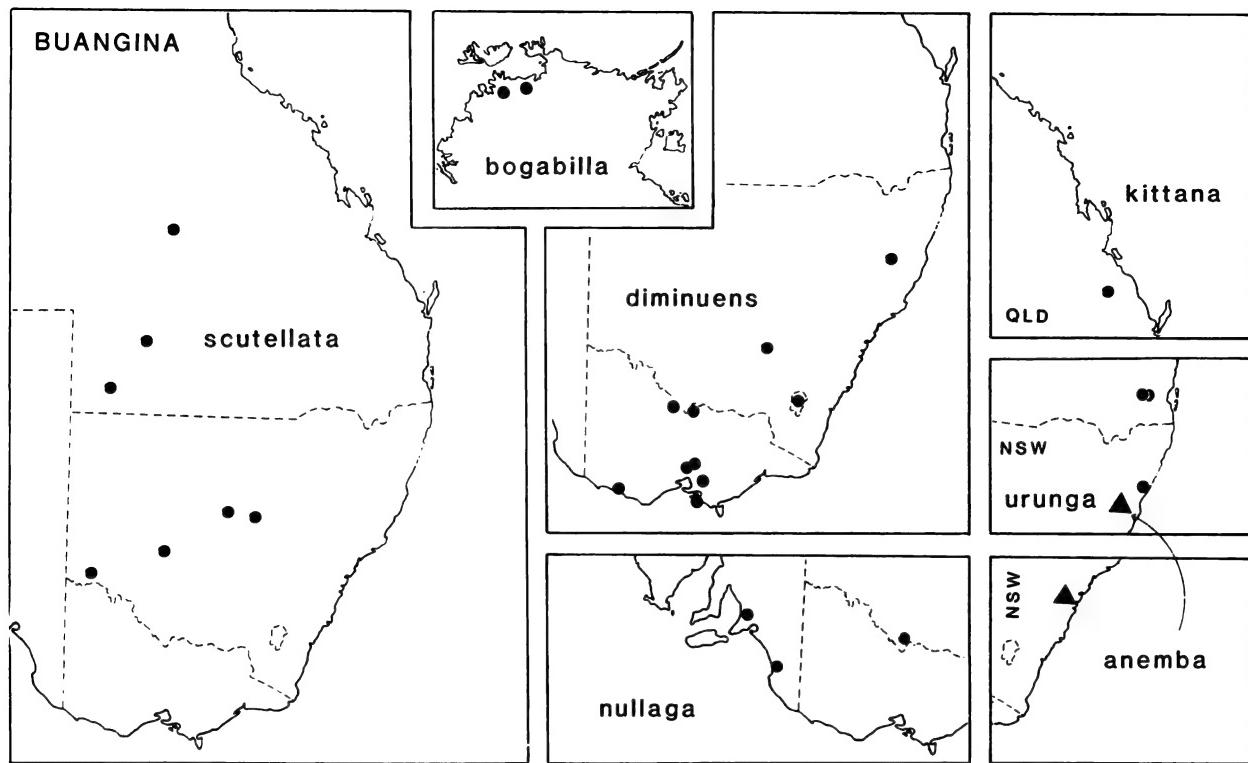
HABITAT. Grassy areas. Two singing males ensconced in shallow, nearly horizontal burrows under clumps of short grass; others in deeper burrows possibly excavated partly by other animals. Three females on more or less bare soil. Abundant and generally distributed around Melbourne.

SPECIMENS. Holotype ♂ BM. A-312 3♂ 3♀ ANC. A-316 2♂ 2♀ ANC. A-318 1♂ 2♀ ANSP. A-318 1♂ 2♀ ANC. A-360 1♂ ANC. A-426 1♂ UM. A-430 1♀ ANC. A-529 1♂ ANC. NEW SOUTH WALES: Black Mt, ACT, 19 x 1961, 1♂; 3 xi 61, 1♂; 7 xi 1961, 1♀; 8 ii 1962, 1♂ (Common) ANC. Metz Gorge, near Armidale, 19 xii 1965 (Cantrell) 1♂ ANC. 6 mi WNW Caragabal, 23 xi 1950 (Newcombe) 1♀ ANC. VICTORIA: Skeleton Ck, 3 mi S Nathalia, 25 xii 1966 (Liepa) 1♂ ANC.

***Buangina kittana* n. sp., Figs. 55FG, 75D, 76BH**

RANGE. Type locality in eastern QLD.

RECOGNITION. Males: Head reddish brown; back of head with faint stripes. File with ca. 60 teeth. Legs I and II mostly pale. Head wider than prono-

FIG. 73. *Buangina* distributions.

tum. Body length less than 10 mm. Top of pronotum mottled. Face reddish-brown, with pale median stripe from median ocellus to clypeus. Side of head with pale yellowish patch behind eyes. Legs generally pale, but with several pale brown marks. Tibiae I and II faintly banded in proximate third. Tympanal openings only on outer face. Femur III somewhat speckled on top, reddish in distal third. Tibia III with 4 inner and 5 outer subapical spurs. Basitarsus III with 7 inner and 7 outer spines. Top of abdomen reddish-brown, transversely banded. Bottom of abdomen pale. Genitalia as in Fig. 75D. Holotype measurements: Head width 1.04 times greatest pronotal width. Pronotal width 1.63 times its length. FW length 3.13 times pronotal length. File with 59 teeth. FW venation as in Fig. 76B. Body length 9.3 mm, FW 4.5 mm, femur III 5 mm, tibia III 3 mm.

HOLOTYPE. ♂, A-516, 13 miles northeast of Mento along Burnett Hwy. QLD, 22 ii 1969, ANC.

SONG. Fig. 74. Groups of chirps (8–9 ch/group) at roughly 10 ch/s at 23°C. First chirps in group have fewer pulses. For example, one group had following

pulses per chirp: 3, 3, 4, 4, 5, 5, 5, 5, 4. Pulse rate roughly 70 p/s at 23°C.

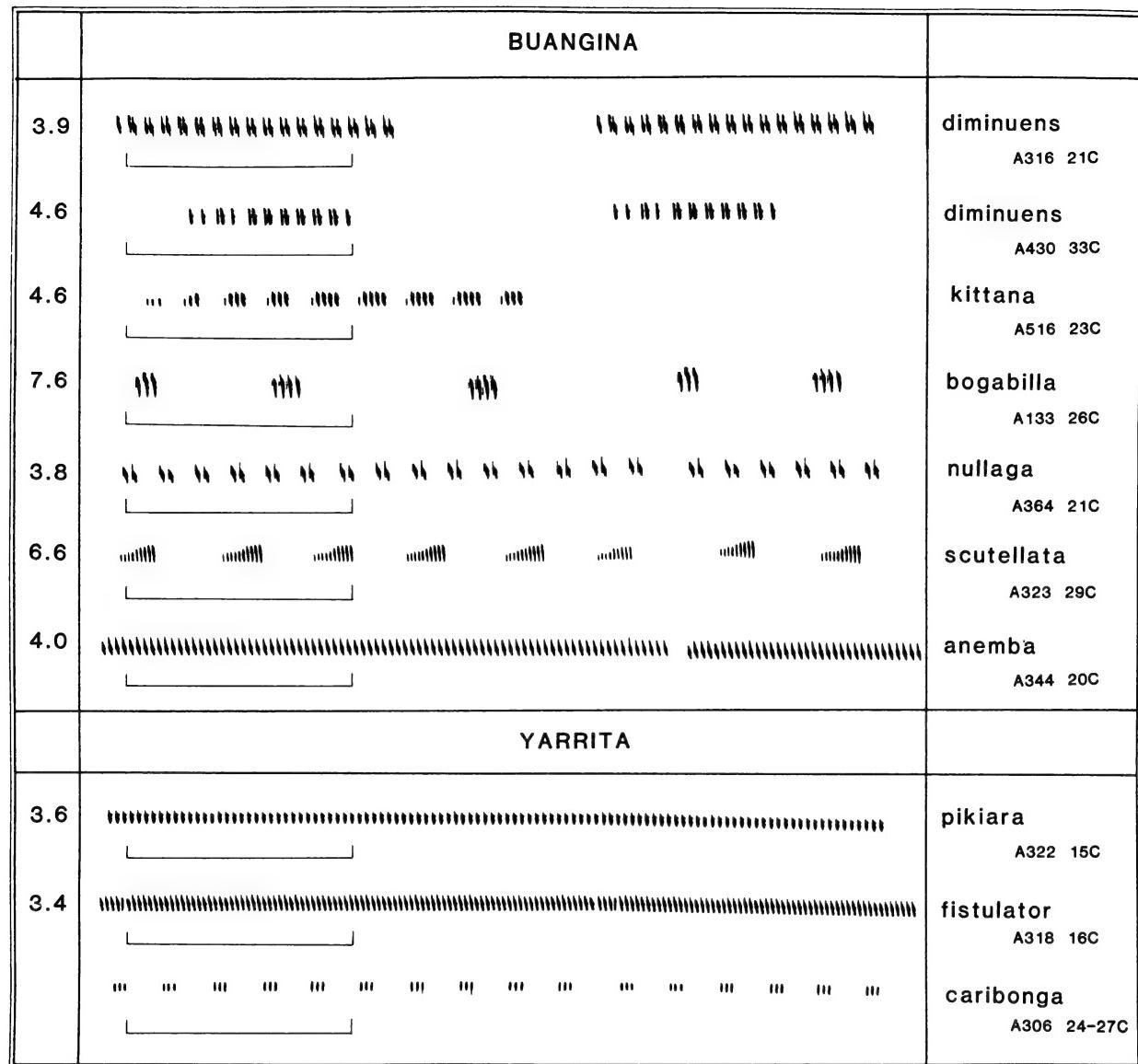
HABITAT. Three males heard in red clay soil banks next to road. Captured male singing from hollowed-out burrow beneath grass clump.

SPECIMENS. Holotype ♂ ANC.

Buangina bogabilla n. sp., Fig. 76D

RANGE. Known only from the vicinity of Darwin, NT.

RECOGNITION. Males: Body color dark reddish-brown, almost black. Back of head with 6 pale stripes. Top front of head with large white patch connecting all 3 ocelli. Face reddish-brown. Palpi white. Head width 0.94 times width of pronotum. Disk of pronotum as dark as head. Lateral lobes also dark but becoming lighter brown near bottom. FW brown, with small mirror (Fig. 76D) and with vein 1A connecting to Cu₂ near base of wing. Files for the series of males from A-133 had the following numbers of teeth: 123, 126, 128, 129, 131, 132, 140, 149, 150. FW 1.75 times width of pronotum. Ab-

FIG. 74. *Buangina* and *Yarrita* songs. Scale = 0.5 s.

domen nearly black on top. Femora I and II with much brown in distal half. Tibia I and II brown through much of proximal half. Femur III mostly dark brown on top, with oblique brown bands on top outer face and on lower front face. Tibia III dark brown, with 6 inner and 6 outer subapical spurs. Top of basitarsus III with about 11 outer spines and 6 inner spines. Cerci brownish with black hairs. Holotype measurements: Body length

12.2 mm, FW length 6 mm, femur III 7.2 mm, tibia III 5 mm, cerci 6.3 mm.

Females: Body color as in males. FW's oval and nonoverlapping, 0.69 times as long as pronotum. Ovipositor 3.82 times as long as pronotum. Body length 12.5 mm; femur III 8.0 mm, ovipositor 8.0 mm.

HOLOTYPE. ♂, A-133, Howard Springs, near Darwin, NT, 25 ix 1968, ANC.

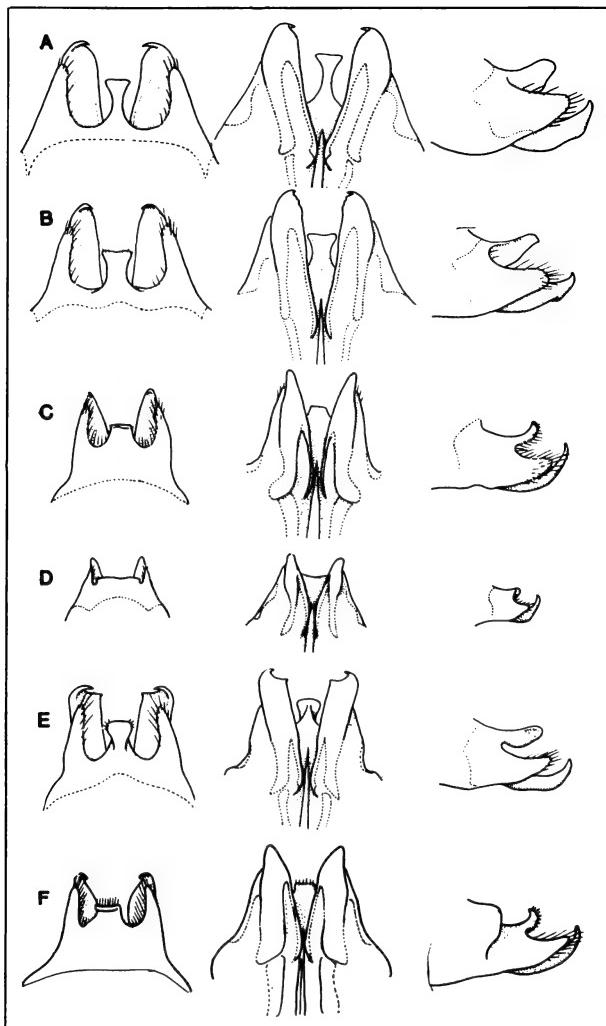


FIG. 75. *Buangina* male genitalia (dorsal, ventral, lateral). A, *diminuens*; B, *anemba*; C, *urunga*; D, *kittana*; E, *scutellata*; F, *urunga*.

SONG. Fig. 74. Short chirps delivered either very erratically or more or less in groups with maximum rate of about 4/s at 26°C. Chirps consist of 3 to 5 pulses.

	p/s	ch/s	p/ch	kps	°C
A-133	56	4	3-5	7.6-7.9	26

HABITAT. Mud cracks in a drying water hole.

SPECIMENS. Holotype ♂ ANC. A-133 6♂ 1♀ ANC, 1♂ UM, 1♂ ANSP.

LISTENING RECORDS. A-139.

Buangina scutellata (Chopard), Figs. 55H, 75E

Gryllulus scutellatus Chopard 1951: 414. Holotype ♂, Lake Muligan, South Australia, SAM. Chopard labelled this species *G. rostratus*, a preoccupied name. He apparently realized his error in time to give a different name to this species but too late to relabel the type. Type examined.

RANGE. Central and western NSW and south-eastern QLD.

RECOGNITION. Males: Dorsum of body dark brown. Dorsum of head with two prominent pale bands, one connecting lateral ocelli, and other running across vertex roughly between backs of eyes (Fig. 55H). Pronotal disk (top view) mostly dark red-brown, but with pale marks at each corner. Lateral lobes dark brown, but with pale band along anterior margin and lower front corner. FW with complete and undivided mirror and reduced apical area (1 to 2 cells wide); brown along R and Sc veins, mostly pale and transparent on dorsal field. File with 86-90 teeth (n=2). Femur III with oblique red-brown stripes on top half of outer face. Tibia III pale, almost white on top, darker below. With 6 outer and 5 inner subapical spurs. Basitarsus III with 7 outer and 6 inner spines. Genitalia as in Fig. 75E. Body length ca. 14.0 mm, FW length ca. 5.5 mm, femur III ca. 7.5 mm, tibia III ca. 5.3 mm.

Females: Similar to males in color. FW's usually at least 3 times as long as pronotum. HW's extending well beyond end of abdomen. Ovipositor about 1.26 times as long as femur III. Body length 14-17 mm; femur III 8-10 mm.

SONG. Fig. 74. Succession of 9-10 pulse chirps with last pulses more intense than first ones. Chirps in groups of 6-24 and delivered at roughly 5 chirps/s at 29°C.

	p/s	ch/s	p/ch	ch/group	kps	°C
A-323	112	4.8	8-10	6-24	6.4-6.8	29
A-436	72	2.4	13		5.4	23

HABITAT. Found singing in large numbers in daytime in soil cracks near Willandra Creek.

SPECIMENS. Holotype ♂ SAM. A-323 1♂ UM. A-436 1♂ ANC, 1♂ ANSP. A-466 2♀ ANC. 65 mi NW Nyngan, NSW, 21 x 1949 (Riek) 1♀ ANC. 4 mi NW Trangie, NSW, 13 xi 1968 (Lewis) 1♀ ANC. 3 mi N Eromanga, QLD, 3 xi 1967 (Lewis) 1♀ ANC. 25 mi S Noccundra, QLD, 8 xi 1949 (Riek) 1♀ ANC.

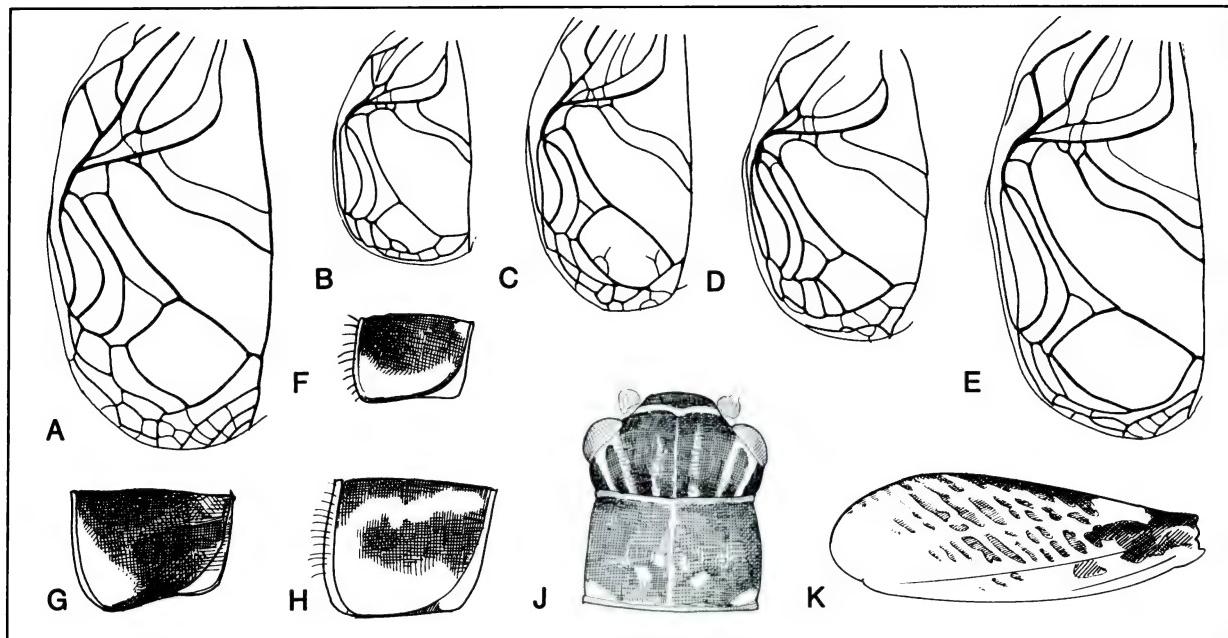


FIG. 76. *Buangina*. A, *diminuens*; B, *kittana*; C, *nullaga*; D, *bogabilla* A-133; E, *urunga*; F, *nullaga* lateral lobe; G, *anemba* lateral lobe; H, *kittana* lateral lobe; J, *nullaga*; K, *nullaga* femur III outer.

Buangina nullaga n. sp., Fig. 76CJK

RANGE. Known from southeastern SA and southern NSW.

RECOGNITION. Males: Body color reddish-brown; legs generally pale. Top of head with 6 stripes (Fig. 76J). Face mostly reddish-brown. Palpi pale. Side of head mostly pale but with dark brown posterior margin and brown patch just behind posterior margin of eye. Disk of pronotum same color as top of head, and with lighter marks as in Fig. 76J. Lateral lobe dark above, pale below. FW pale brown on bottom and dark brown on top half of lateral field. Mirror complete and with several veins intruding into the mirror. File with 69–74 teeth ($n=3$), but male from A-370 has 97 teeth. Abdomen reddish-brown above, pale brown below; subgenital plate somewhat darker than preceding sternites. Legs I and II mostly pale but with brown markings in distal half of femora. Tibiae I and II mostly reddish-brown on ventral surface. Femur III with oblique rows of spots on top and external faces (Fig. 76K). Tibia III pale on top and reddish-brown below and with 6 outer and 5 inner subapical spurs. Basitarsus III with 7 outer and 5 inner spines. Genitalia as in Fig.

76C. Holotype measurements: Body length 13.5 mm; FW 6.0 mm; femur III 6.8 mm, tibia III 4 mm, cerci 6 mm.

Females: Coloration very similar to holotype, FW's are short, slightly longer than pronotum, non-overlapping and oval. FW length ca. 1.14 times pronotal length. Ovipositor ca. 1.1 times femur III length. Body length 16 mm, femur III 8.3 mm, tibia III 5.5 mm, ovipositor 9 mm.

HOLOTYPE. ♂, A-364, 24 miles north of Kingston, SA, 7 i 1969, ANC.

SONG. Fig. 74. Very similar to *B. diminuens* but with slower pulse and chirp rates and more chirps per group.

	p/s	ch/s	p/ch	ch/group	kps	°C
A-322	45	12.3	2	15–24	3.8	21

HABITAT. Collected near beach north of Kingston, SA.

SPECIMENS. Holotype ♂ ANC. A-364 1♂ 1♀ ANC. A-370 1♂ ANSP.

Buangina urunga n. sp., Figs. 75C, 76E

RANGE. Southeastern QLD and northeastern NSW.

RECOGNITION. Males: Top of body dark brown, legs and bottom of body pale. Top of head blackish. Face dark brown above clypeus; clypeus, labrum and mandibles pale reddish-brown. Palpi largely brown. Side of head with pale area behind eye, beginning above or medial to eyes. Lateral lobes dark on top and pale in ventral half; lower edge thin black line. File with 120–133 teeth (n=3). Two males from A-536 had 120 and 123 teeth. Lateral field of FW nearly black in dorsal half, pale in lower half. Legs I and II mostly pale. Femora I and II with small round brown spots on top and with dark setae. Femur III mostly yellowish and with very faint oblique reddish streaks on top outer face. Tibiae III slightly darker than femora and with 6 outer and 5 inner subapical spurs. Basitarsus III with 11 outer and 8 inner spurs. Abdomen dark brown above, pale below (including subgenital plate). Genitalia as in Fig. 75C. Holotype measurements: Pronotal width 1.64 times pronotal length. FW length 3.00 times pronotal length. Body length 15.5 mm; femur III 9 mm, tibia III 6.3 mm, cerci 8.3 mm, FW 7.5 mm. File with 133 teeth.

HOLOTYPE. ♂, A-562, Newry State Forest, near Urunga, NSW, 25 ii 1969, ANC.

SONG. Succession of short clear trills (5 trills/10 s) with about 14 pulses per trill. Tape lost.

HABITAT. Three males heard at type locality; two captured under leaves and in grass in open, grazed forest with dead logs about.

SPECIMENS. Holotype ♂ ANC. A-536 2♂ ANC.

LISTENING RECORDS. A-537.

Buangina anemba n. sp., Figs. 75B, 76G

RANGE. Known from two localities in eastern NSW.

RECOGNITION. Males: Head striped somewhat as in *B. nullaga*; otherwise rather similar to *B. urunga*. Top of pronotum somewhat mottled in holotype. Lateral lobes as in Fig. 76G. FW short, ca. 2.1 times pronotal length. FW with small undivided mirror and with 2 or 3 harp veins (one distinct). File with 77, 80 teeth. Legs I and II with brown markings; the distal extremity of femora I and II is particularly dark. Tibiae I and II pale on dorsal face and brown

underneath. Femora III rather as in *B. nullaga* (Fig. 76K). Top of abdomen dark brown. Bottom of abdomen light brown; subgenital plate dark brown. Tibia III brown to dark brown. Tarsi III light brown. Basitarsus III with 8 outer and 6 inner spurs. Genitalia as in Fig. 75B. Body length 16.5 mm; femur III 8.3 mm, tibia III 6 mm. File with 80 teeth.

Females: (Armidale, NSW). Only female has FW 1.50 times as long as pronotum and ovipositor 0.93 times as long as femur III.

HOLOTYPE. ♂, A-344, Penrith, NSW, 29 xii 1968, ANC.

SONG. Fig. 74. Succession of 2–3 second trills delivered 12 per minute at 20°C and with pulse rate of about 65 per second. One trill of 162 pulses lasted 2.5 seconds.

	p/s	trill rate	p/tr	kps	°C
A-344	65–80	12 tr/min	ca. 160	4.0	20

HABITAT. Found singing at night in grass along road in town.

SPECIMENS. Holotype ♂ ANC. Armidale, NSW, xi 1978 (Davidson) 1♂ 1♀ ANC.

YARRITA n. gen.

TYPE SPECIES. *Yarrita pikiara* n. sp.

This genus which presently includes four species is known mainly from the southeastern quarter of the country. One species tentatively assigned to the genus (*Y. caribonga*) has been found only at a single site in the Kimberley district of WA. *Y. woomera* and *Y. pikiara* are very similar but the epiphallus is sufficiently different that we believe two species are involved. This uncertainty will remain until the song of *Y. woomera* is known.

RECOGNITION. This genus possesses following combination of characteristics which distinguish it from the related genera *Buangina* and *Birubia*: Head black, without stripes on back of head, and without pale band running transversely between lateral ocelli (Fig. 55O). Tibia I with large outer and very small or rudimentary inner tympana. Lateral lobes entirely black. Genitalia (top view) with prominent medial projection (as in *Buangina* and *Birubia* but unlike species in the Duldranalia Group

of the genus *Aritella*). Legs black. Mirror complete, divided or undivided. Harp with 2 veins.

pikiara

1. Male epiphallus as in Fig. 79C.
2. Song slower trill (Fig. 74).

fistulator

1. Male epiphallus as in Fig. 79A.
2. Song faster trill (Fig. 74).

woomera

1. Male epiphallus as in Fig. 79B.
2. Song not known—if similar to *Y. pikiara*, then *Y. woomera* probably conspecific with that species.

caribonga

1. Male epiphallus as in Fig. 79F.
2. Song probably series of chirps (Fig. 74).

***Yarrita pikiara* n. sp., Figs. 77, 79CDE**

RANGE. Murray-Darling Basin.

RECOGNITION. Males: Body color black. Legs black. Top of head and pronotum black. Ocelli white, but forehead without white band connecting ocelli as in *Buangina diminuens*. Face and side of head dark brown to black. Palpi dark. Pronotum entirely black. Head width 0.87 times greatest pronotal width. Pronotal width 1.64 times pronotal length. FW venation as in Fig. 79DE. File with 69–85 teeth ($n=3$). In holotype mirror is divided, but in paratype it is not (Fig. 79D). Legs dark brown to black and hairy throughout. Abdomen black on dorsum, dark brown on venter. Genitalia as in Fig. 79C. Holotype measurements: Body length 18 mm, femur III 8 mm, tibia III 5.5 mm, FW 9 mm. Head width 0.87 times as wide as pronotum. Pronotal width 1.64 times as wide as pronotal length.

Females: FW length variable, usually 2.5–3.5 times as long as pronotum, rarely about 1.5 times as long. When FW's are long the HW's extend well beyond end of abdomen. Ovipositor 1.0–1.1 times as long as femur III. Body length 14–17 mm; femur III 9.5–12 mm.

HOLOTYPE. ♂, A-322 Deniliquin, NSW, 26 xii 1968, ANC.

SONG. Fig. 74. Irregular succession of trills about 2 seconds long at about 8 trills per minute. One trill of $2\frac{1}{8}$ s had 134 pulses.

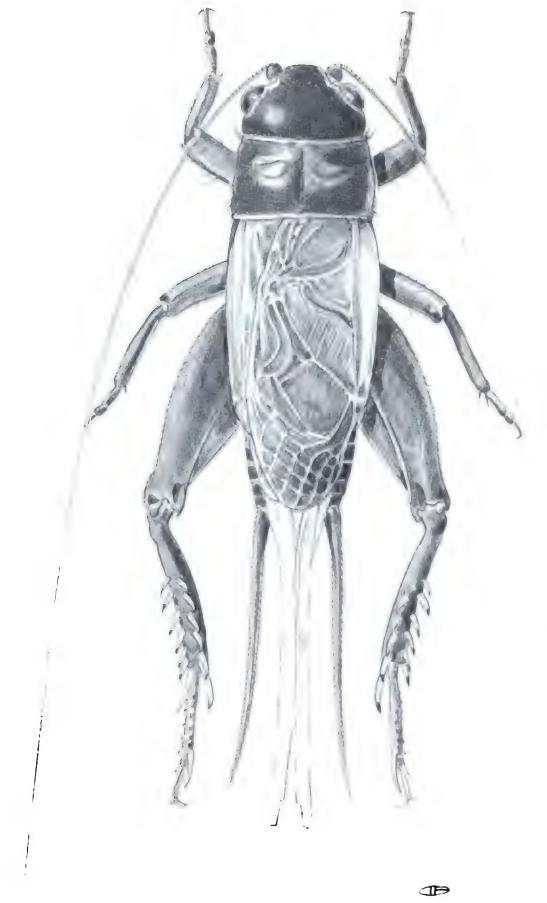


FIG. 77. *Yarrita pikiara* (macropterous).

HABITAT. Soil cracks in open grasslands.

SPECIMENS. Holotype ♂ ANC. A-322 1♂ ANC. A-336 1♂ ANC. NEW SOUTH WALES: Trangie, x, xi, 3♂ 8♀ ANC. N.HL Ainslie, ACT, 11 i 1966 (Upton) 1♂ ANC. Black Mt, ACT, xii, i, 1♂ 6♀ ANC. Parkes, 28 x 1967 (Key) 1♂ ANC. 3 mi E Conargo, 15 xi 1965 (Chinnick) 1♂ ANC. Willandra Bridge, 11 km N Mossiel, 21 xii 1970 (Britton et al.) 1♂ ANC. Armidale, xi 1978 (Davidson) 3♂ 1♀ ANC. QUEENSLAND: 10 mi NE Tanbar HS, 17 iii 1964 (Chinnick) 1♂ ANC. SOUTH AUSTRALIA: Mernmerna, 2 xi 1959 (Aitken) 1♂ 1♀ SAM.

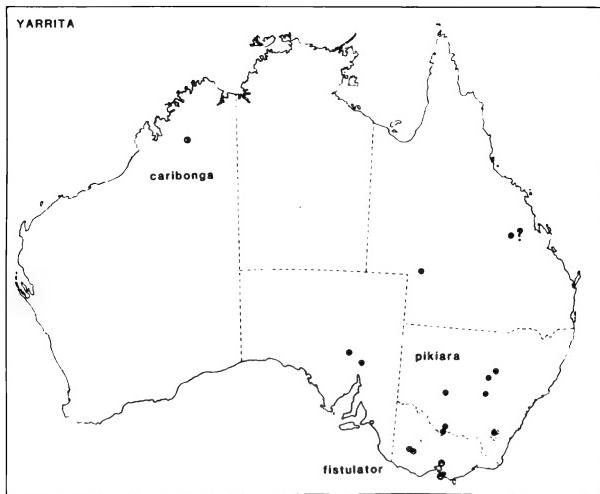
LISTENING RECORDS. A-337, A-507?

***Yarrita fistulator* (Saussure), Fig. 79A**

Gryllodes fistulator Saussure 1877: 212. Holotype ♂, Melbourne, Victoria, GM. Transferred to *Gryllulus* by Chopard 1951: 414. Type examined.

RANGE. Vicinity of Melbourne, VIC.

	p/s	kps	°C
A-336	73	3.7	19
A-322	61	3.6	14
A-507	80	4.7	26
A-422	59	4.5	14

FIG. 78. *Yarrita* distributions.

RECOGNITION. Males: Very similar to *Y. pikiara* but differing in song. Head and pronotum black. Legs and top of abdomen dark reddish-brown. Head 0.9 times as wide as pronotum. Pronotal width 1.63 times pronotal length. FW 2.33 times as

long as pronotum. FW extends to about middle of abdomen. File with 90 teeth. Genitalia as in Fig. 79A. Body length of an example male, 16 mm, FW 6.8 mm, femur III 9 mm, tibia III 6.8 mm.

SONG. Fig. 74. Series of trills lasting 1–3 seconds, rarely less, and at 5 trills in 20 seconds in one case. One trill lasting 2.8 seconds had 234 pulses.

	p/s	kps	°C
A-318	82.8	3.4	16

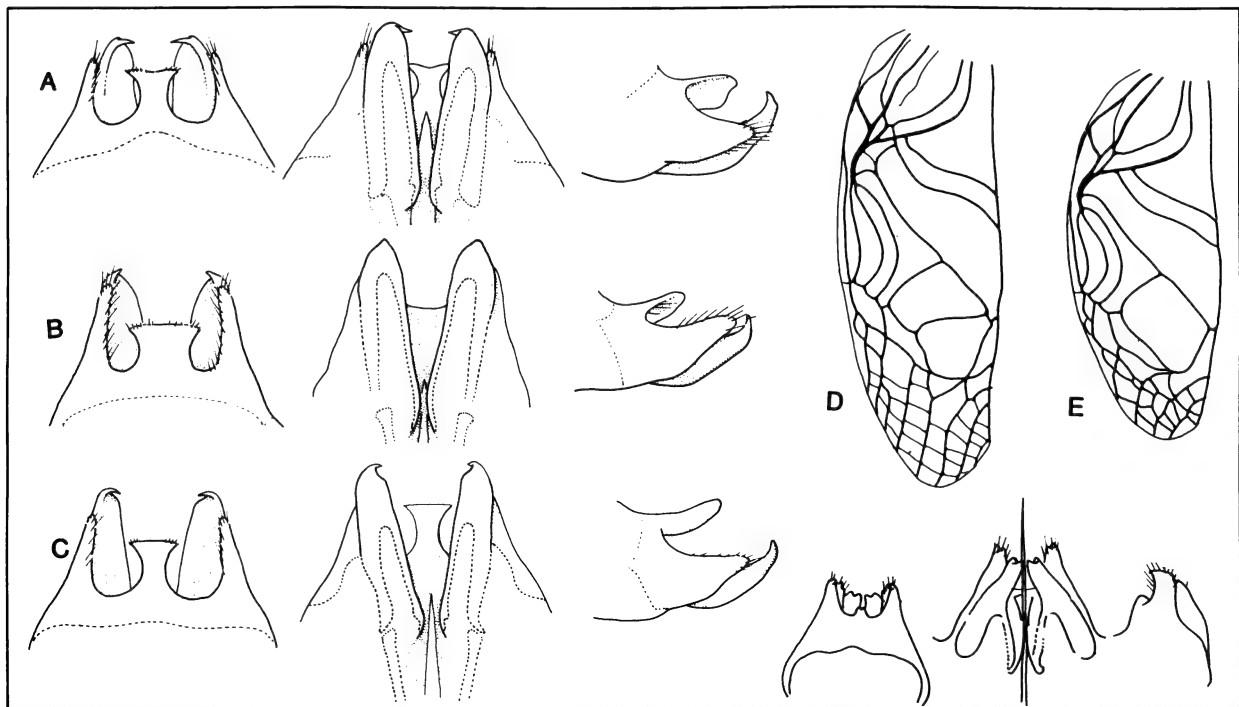
HABITAT. Fairly abundant along grassy bank perhaps 50 meters from ocean. Found singing along road at dusk and later at night.

SPECIMENS. Holotype ♂ GM. A-318 1♂ ANC.
LISTENING RECORDS. A-422, A-423.

Yarrita woomera n. sp., Fig. 79B

RANGE. Type locality in Woomera, SA.

RECOGNITION. Males: Very similar to *Y. pikiara*. Song not known. On basis of genitalic differences we consider holotype to belong to species distinct

FIG. 79. *Yarrita*. A, *fistulator*; B, *woomera*; C, *pikiara*; D, *pikiara* A-322; E, *pikiara* A-322; F, *caribonga* holotype.

from *Y. pikiara*. Mirror of forewing without dividing vein. Macropterous, HW extending beyond ends of cerci. File with 92 teeth. Genitalia as in Fig. 79B. Body length 15 mm, femur III 8.8 mm, tibia III 4.5 mm, FW 9 mm, cerci 8 mm.

HOLOTYPE. ♂, A-659, Woomera, SA, 11 i 1969, ANC.

SONG. Not known.

HABITAT. Found at lights in Woomera, SA.

SPECIMENS. Holotype ♂ ANC.

Yarrita caribonga n. sp., Fig. 79F

RANGE. Type locality in Kimberley district, WA.

RECOGNITION. Males: Only specimen partially crushed while being captured. Similar to *Y. pikiara* but differing in genitalia and song. Body color dark reddish-brown—almost black. Pale on venter of thorax and basal abdomen. Mirror undivided and apical area of FW longer than medial length of mirror. File has 149 teeth (n=1). Tibia III with 5 outer and 4 inner subapical spurs. Tibia I with very small inner tympanum, in length about $\frac{1}{3}$ tibial diameter. Femur III 1.42 times as long as tibia III. Tibia III 1.79 times as long as basitarsus III. Genitalia as in Fig. 79F. Body length unknown; FW ca. 6.0 mm; femur III 6.6 mm; tibia III 4.7 mm; cerci 7.3 mm.

HOLOTYPE. ♂, A-806, 10 miles northwest of Leopold Downs, WA, 16 v 1969, ANC.

SONG. Uncertain. We believe this male made sounds shown in Fig. 74 and table below.

	p/s	ch/s	p/ch	kps	°C
A-806	40	4.5	3	8	27

HABITAT. Soil crevices in open plains.

SPECIMENS. Holotype ♂ ANC.

ARITELLA GENUS GROUP

This group includes five Australian genera, all of them new. These usually reddish crickets range through most of the interior of the continent, but with one genus *Pictorina*, occurring in open eucalyptus forests as far east as Townsville. Unlike members of the *Comidogryllus* Genus Group members of this group usually inhabit dry soils, and are commonly taken in rocky uplands, red soils, and in rock outcroppings.

RECOGNITION. (See under Tribe *Modicogryllini*.)

Aritella

1. Mirror complete.
2. Mirror divided.
3. Two veins connect veins 2A and 3A in basal area (Figs. 86, 94, 98).
4. Body not flat and cerci not streaked.
5. Harp veins not strongly bent.
6. Females with short or long FW's.

Pictorina

1. Mirror complete.
2. Mirror not divided.
3. Two veins connect veins 2A and 3A (Fig. 102).
4. Body not flat and cerci not streaked.
5. Harp veins not strongly bent.
6. Females without FW's.

Rufocephalus

1. Mirror complete.
2. Mirror not divided.
3. Two veins connect veins 2A and 3A (Fig. 106).
4. Body sometimes flat, but cerci not streaked.
5. Harp veins not strongly bent.
6. Condition of female FW's not known.

Apedina

1. Mirror complete.
2. Mirror not divided.
3. One vein connects veins 2A and 3A (Fig. 110).
4. *Body flattened. Cerci with longitudinal dark streaks on inner and/or outer faces* (Fig. 107).
5. Harp veins not strongly bent.
6. Females without FW's (n=1 sp.).

Tumpalia

1. *Mirror absent.*
2. (*Mirror absent.*)
3. One vein connects veins 2A and 3A (Fig. 114).
4. Body not flattened and cerci not streaked.
5. *Harp veins strongly bent* (Fig. 114).
6. Females with short FW's (n=1 sp.).

ARITELLA n. gen.

TYPE SPECIES. *Aritella ilya* n. sp.

This genus is widely distributed over the continent, but is better represented in the north than in the south and in the interior than along the coasts. Most of the species are associated with open country and are most often found inhabiting soil cracks. When the soil is hard it becomes exceptionally difficult to catch males who generally sing at or near the tops of the cracks. A shovel can sometimes be used to forcefully and quickly block them from descending into the cracks. Specimens collected in this way are likely to be crushed and several species are represented only by crushed males.

RECOGNITION. Males distinguished from other

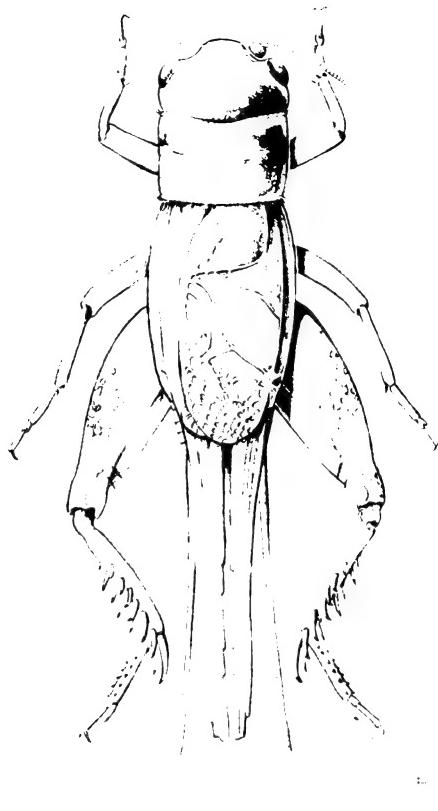


FIG. 80. *Aritella cooma* (macropterous).

Aritellae by following combination of characteristics: (1) Mirror complete (*Tumpalia* lacks a mirror); (2) Mirror divided, sometimes several times; (3) FW with two veins connecting veins 2A and 3A (shared with *Pictorina* and *Rufoccephalus*).

The species in the genus can be arranged into five species groups; four of the groups are quite well defined but the fifth includes several species which do not fit easily into the first four and which do not form a cohesive grouping.

Ilya Group

1. Mirror wholly or partly divided into at least 3 cells (Fig. 86A-G).
2. Epiphallus without narrow median process.
3. Parameres of genitalia without internal spines.
4. Head yellow-orange to reddish.

Dumpalia Group

1. Mirror wholly or partly divided into 3 cells (rarely more) (Fig. 92EF).

2. Epiphallus with very narrow median process (Fig. 92).
3. Parameres without inner spines.
4. Head yellow-orange to reddish.

Leengila Group

1. Mirror wholly or partly divided into 2 cells.
2. Epiphallus without a narrow median process (Fig. 93).
3. Parameres with distinct inner spines (Fig. 93).
4. Head reddish.

Duldrana Group

1. Mirror wholly or partly divided into 2 cells.
2. Epiphallus without very narrow median process (Fig. 94).
3. Parameres without inner spines.
4. Head (and rest of body) black.

Miscellaneous Group

1. Mirror wholly or partly divided into 2 cells.
2. Epiphallus variable, but not like *Dumpalia* Group.
3. Parameres without inner spines.
4. Head variable, usually orange to reddish, black in *A. laticaput*.

KEY TO ARITELLA SPECIES GROUPS

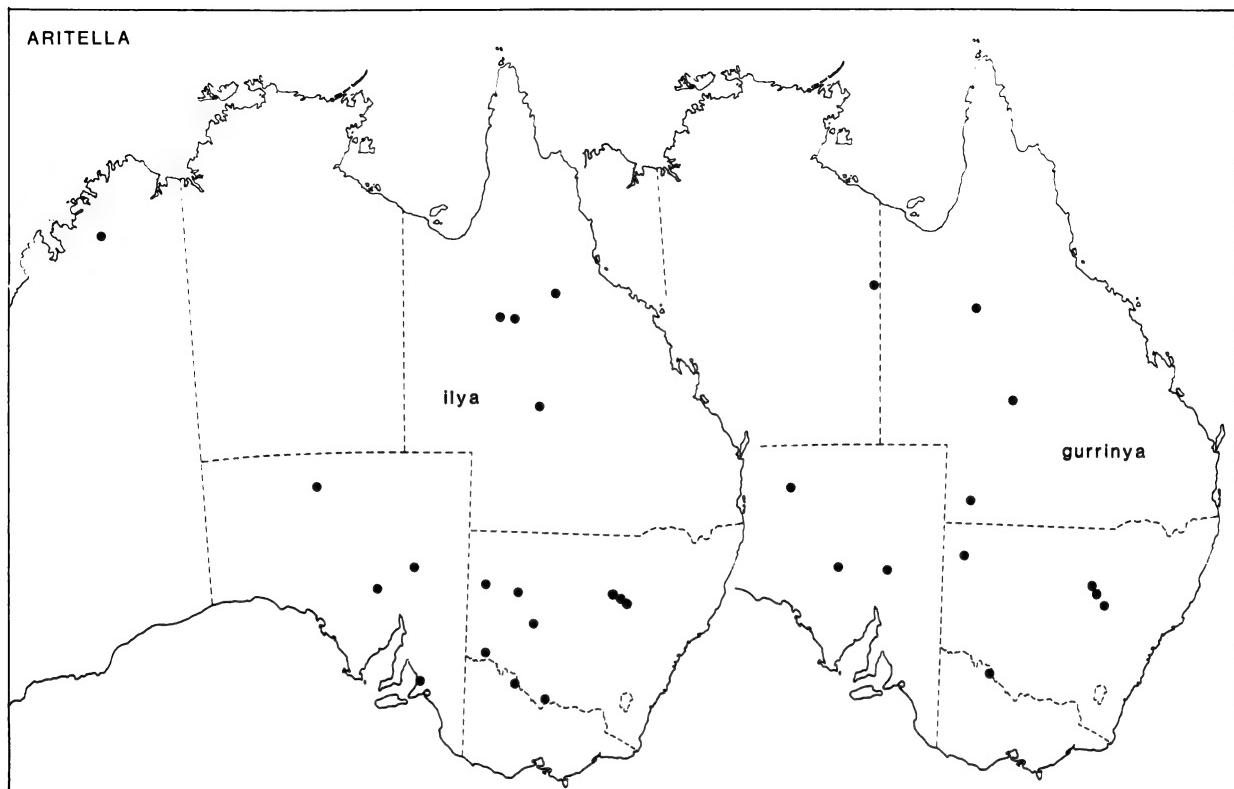
1. Mirror wholly or partially divided into at least 3 cells 2
Mirror wholly or partially divided into 2 cells 3
2. Mirror divided into 3 cells (Fig. 92EF). Epiphallus with a narrow median lobe (Fig. 92AB) *Dumpalia* Group
Mirror divided into 3 or more cells (Fig. 86A-G). Epiphallus not as above *Ilya* Group
3. Body color blackish, including legs. Genitalia as in Fig. 94. Small species *Duldrana* Group
Body not blackish, or if dark, legs are pale. Genitalia not as above 4
4. Parameres with spine-like projections on the internal face (Fig. 93) *Leengila* Group
Parameres not as above Miscellaneous Group

ILYA GROUP

This group is a somewhat loose assemblage of seven species in which the mirror is wholly or partially divided into at least 3 cells, and in most of the species the apical area is well developed (Fig. 86A-G). Tibia III usually has 7 outer subapical spurs (except *R. arinya* which has 6).

KEY TO SPECIES OF ILYA GROUP

1. Clypeus strongly angulate on top, with two sides almost forming right angle (Fig. 86K) 2
Clypeus not as above, either more rounded or not as angulate (Fig. 86LMN) 5
2. Genitalia as in Fig. 87A. Veins in chordal and apical areas of FW yellowish, much lighter than surrounding membrane *ilya*
Genitalia not as above. Veins of FW about same color as membrane 3
3. FW darkly pigmented in apical area. Genitalia similar to Fig. 87G. File with 115-146 teeth *fulviceps*
FW somewhat orange, not especially dark in apical area.
Genitalia not as above 4

FIG. 81. *Aritella* distributions. Ilya Group (part).

4. Genitalia with strongly bent parameres (Fig. 87EF)
..... *gurrinya*
Genitalia without strongly bent parameres and more as
in Fig. 87BCD *cooma*
5. Parameres broad basally, coming to point distally (Fig.
87J) *girralonga*
Parameres not as above 6
6. Small, body length less than 13 mm. Genitalia as in Fig.
87KLM *arinya*
Larger, body length more than 16 mm. Genitalia as in
Fig. 87H *chidnaria*

Aritella ilya n. sp., Figs. 86FHK, 87A

RANGE. Widespread in interior of QLD, NSW, and SA. Male believed to be this species taped in Kimberley district, WA.

RECOGNITION. Males: Best distinguished from *A. gurrinya* and *A. cooma* on basis of shape of genitalia and songs. Macropterous or micropterous. Body color orange. Top of head uniformly orange, smooth, hairless. No pale bands on back of head. No pale band running between lateral ocelli. Face reddish, pale on lower section of clypeus and la-

brum. Palpi nearly white. Side of head yellow to red. Lateral lobes marked as in Fig. 86H. Pronotum widest at anterior end. FW's reddish-brown and with yellow veins, especially in chordal and apical areas. FW venation as in Fig. 86F. Mirror divided. FW ca. 3.0 times as long as pronotum. Lateral field of FW pale in ventral half, darker in dorsal half and with dark brown band along and ventral to Sc vein. File with 103–128 teeth. Legs I and II uniformly pale brown or tan but with dark brown setae. Femur III more or less uniformly reddish, but with faint darker oblique stripes on top external face. Tibia III with 6 inner and 7 outer subapical spurs. Basitarsus III with 7 inner and 7 outer spines. Femur III 1.54 times as long as tibia III. Dorsum of abdomen reddish-brown and with transverse pale stripes; venter very pale; subgenital plate slightly darker. Region between bases of cerci pale. Cerci pale brown, covered with brown hairs. Genitalia as in Fig. 87A. Body length ca. 19 mm. Holotype measurements: Pronotum 1.82 times as wide as long.

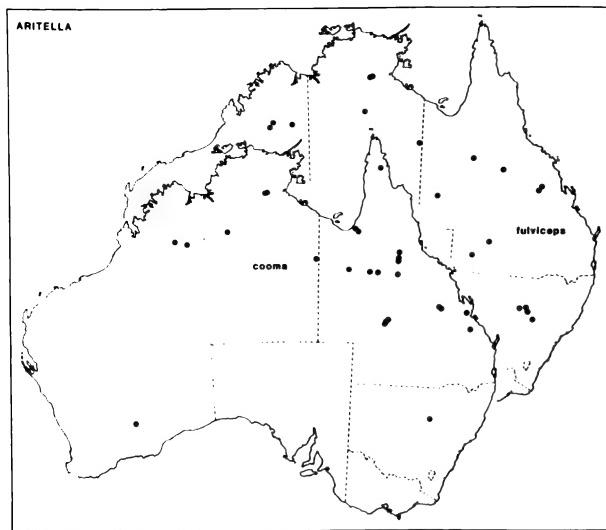


FIG. 82. *Aritella* distributions. Ilya Group (part).

Front of pronotum 1.82 times as wide as rear. Body length 19 mm; FW length 9 mm; femur III 9.2 mm; tibia III 6.5 mm; cerci 12 mm.

Females: HW's either invisible or extending well beyond abdomen. In long-winged individuals FW's

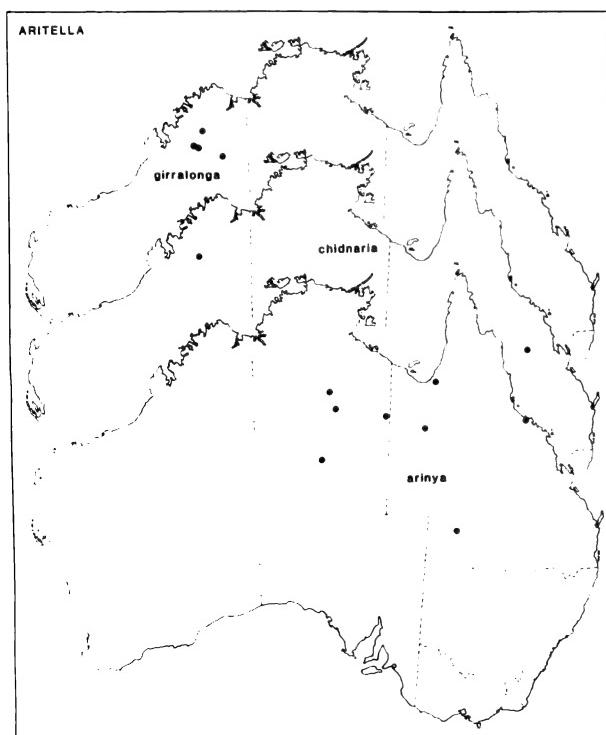


FIG. 83. *Aritella* distributions. Ilya Group (part).

are 3 or more times as long as pronotum. In short-winged female (A-369) they overlap medially and are 1.24 times as long as pronotum. Ovipositor 0.71 times as long as femur III (A-369).

VARIATION. Files vary as follows: A-67 (128 teeth); 68 (105, 108); 325 (119); 334 (107, 111); 336 (106, 112); 443 (108, 112); 464 (113); 405 (103). Coloration is quite variable from pale yellow-brown to orange and to dark reddish-brown. FW length is also variable. The mirror always seems to be divided, although not always precisely as in Fig. 86F.

HOLOTYPE. ♂, A-325, 90 miles south of Wilcannia on road from Ivanhoe, 27 xii 1968, ANC.

SONG. Fig. 84. Trills of irregular length, sometimes lasting 5 to 10 seconds.

	p/s	kps	°C
A-67	44	5.7	29
A-68	62	5.7	28
A-325 n=3	43-44	5.4	23
A-322	32	4.3	14
A-330	36	4.8	20
A-334 n=2	38, 46	5.1, 5.6	24
A-336	39-40	5.0-5.3	19
A-384	51	5.5	30
A-431	38	5.5	27
A-436	38	5.3	23
A-443 n=2	46, 49	5.5, 6.1	27
A-464	62	6.7	29
A-477	33.6	5.2	28
A-610	49	6.4	27
A-784	38	5.1	19

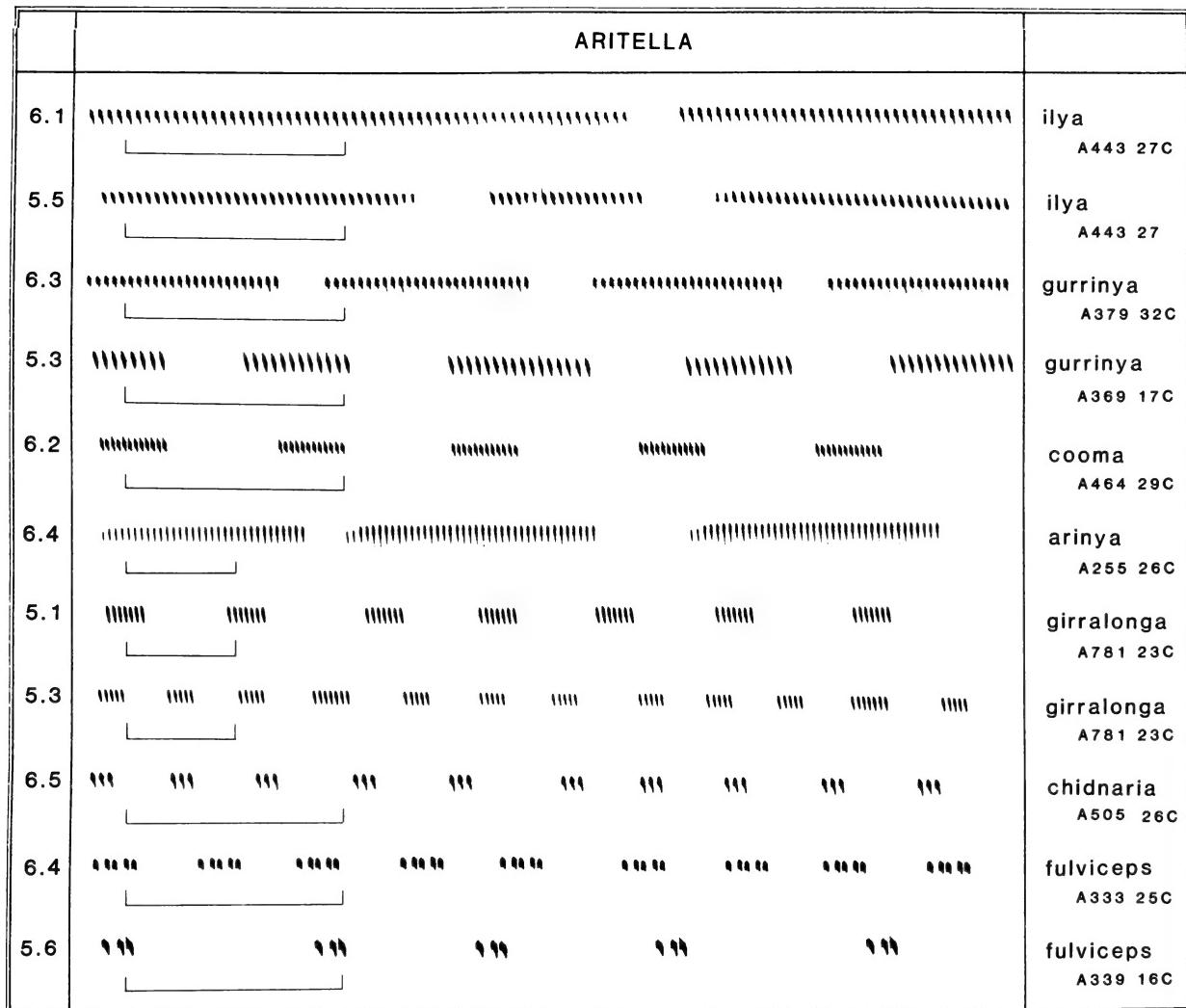
HABITAT. Open grassy plains; usually found in soil crevices.

SPECIMENS. Holotype ♂ ANC. A-67 1♂ ANC. A-68 2♂ ANC. A-334 1♂ ANC, 1♂ UM. A-336 2♂ ANC. A-337 1♂ ANC. A-369 1♂ 1♀ ANC. A-405 1♂ ANSP. A-443 2♂ ANC. A-464 1♂ ANC.

Aritella gurrinya n. sp., Figs. 86EK, 87EF

RANGE. Dry interior of QLD, NSW and SA.

RECOGNITION. Males: Very similar to *A. ilya* but differing in shape of male genitalia (Fig. 87EF). Wing veins in chordal and apical fields not strikingly yellow. Head width 0.96 times greatest pronotal width. Front of pronotum not wider than rear. Greatest pronotal width ca. 1.5 times pronotal length. FW length ca. 2.7 times pronotal length. File with 101-137 teeth (n=10). Femur III ca. 1.5 times as long as tibia III. Tibia III ca. 1.9 times as long as basitarsus III. Tibia III with 6 inner and 7 outer subapical spurs and basitarsus III with 8 outer and 6 inner dorsal spines. Holotype measurements:

FIG. 84. *Aritella* Ilya Group songs. Scale = 0.5 s.

Body length 16 mm; FW 7.8 mm; femur III 9 mm; tibia III 6 mm; cerci broken.

Females: Similar in color to males. FW's vary in length from 1.5 times pronotal length to 3.0 times pronotal length. Ovipositor about 2.5 times pronotal length. Ovipositor 0.74 (A-335), 0.84 (A-336), 0.70 (A-68) times as long as femur III.

VARIATION. The darkness of the red body coloration is quite variable—changing from yellowish to rusty brown. File counts varied as follows: A-339 (101, 112); 369 (113); 379 (112); 449 (114, 114); 464 (113); 71 (127, 137); 335 (109).

HOLOTYPE. ♂, A-449, 20 miles southwest of Nocundra, QLD, 13 ii 1969, ANC.

SONG. Fig. 84. Fairly regular succession of trills. Trills vary in length from one locality to another.

		chirp length p/s	kps	°C
A-339		39	4.7	16
A-369		57	5.3	17
A-379		53	6.3	32
A-379		56	5.8	32
A-407		52	5.5	31
A-431		44	6.0	27
A-447		35	6.8	31
A-449	n=3	54-56	6.2-6.3	36
A-464	n=3	47-52	5.8-6.3	29
A-608		46	6.4	27

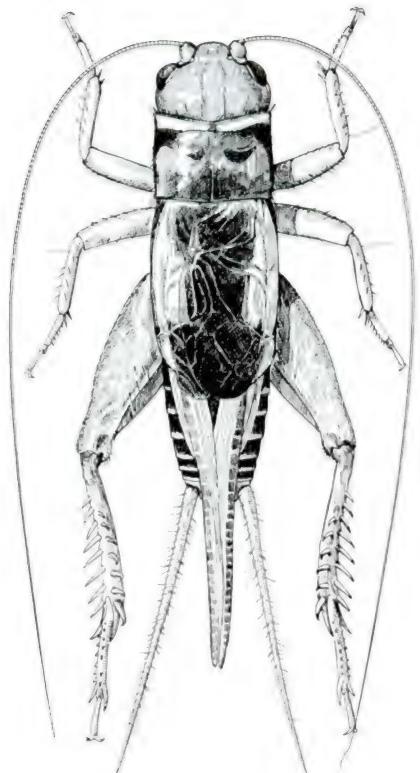


FIG. 85. *Aritella fulviceps* (macropterous).

HABITAT. Open grasslands; usually found hiding in soil cracks.

SPECIMENS. Holotype ♂ ANC. A-68 2♂ 1♀ ANC. A-71 1♂ UM, 2♂ 2♀ ANC. A-309 1♂ ANC. A-335 1♂ 1♀ ANC. A-336 1♂ 1♀ ANC. A-369 1♂ ANC. A-379 1♂ ANSP. A-449 1♀ ANC.

Aritella fulviceps (Mjöberg), Figs. 85, 86BJK, 87G

Gryllodes fulviceps Mjöberg 1913: 33. Type ♀, Noonkanbah, WA, sm. *Gryllulus fulviceps*, Chopard 1951. Type examined.

RANGE. Northern WA and NT; most of interior QLD and NSW.

RECOGNITION. Males: Generally similar to *A. ilya* but differing as follows: Head reddish-orange, distinctly lighter than pronotal disk; top two-thirds of clypeus orange; face very pale below that; pronotal disk patterned as in Fig. 85; lateral lobes patterned as in Fig. 86J; dorsal field of FW dark brown centrally, pale along wing angle; lateral field dark in top two-thirds, but veins pale. Harp area of FW is lightest part of wing and somewhat transparent. Chordal, basal, and apical areas dark. Veins in

chordal and apical areas about same in color as surrounding membrane. File with 115–146 teeth (n=12). Mirror partially divided into several cells. Tibia III much darker than femur, with 7 outer and 6 inner subapical spurs. Top of abdomen dark brown, but tergites with pale posterior margins. Cerci very pale brown. Measurements of a male from A-68: Head 1.02 times as wide as greatest pronotal width. Pronotal width 1.54 times pronotal length. Femur III 1.45 times as long as tibia III. Tibia III 2.40 times as long as basitarsus III. Body length ca. 18 mm; FW length 7.7 mm; femur III 9.3 mm; tibia III 6.3 mm; cerci 12 mm.

Females: Similar in color to males. Distinguishable from other species in group by having forewings dark brown to black over most of dorsal field but pale along lateral margins. Abdomen mostly blackish on dorsum. Ovipositor 0.80–0.91 times as long as femur III. Ovipositor length 8.5–10 mm; femur III length 9.5–11 mm (n=6). FW of micropterous female ca. 5 mm; FW's of macropterous females 8.5–9.5 mm. In macropterous females HW's extend beyond end of ovipositor.

VARIATION. This species is almost always dark reddish-brown and the FW veins in the apical area are never lighter than the surrounding membrane. The head is almost always considerably lighter than the pronotum. HW length is variable, in some cases (A-333) they extend well beyond the end of the abdomen. File counts vary as follows: A-68 (132); 189 (115, 146); 333 (146); 335 (124–145); 470 (123, 125, 129); 505 (126); 816 (129); 218 (130).

SONG. Fig. 84. Complex chirps each containing single pulse followed by one or two pairs of pulses.

	n=2	p/s	p/s	ch/s	kps	°C
			within pairs			
A-68	n=2	50, 59	25, 33	2.6, 3.7	6	28
A-71		59	33	5.7	6.5	28
A-189	n=2	50, 56	29, 31	3.3, 3.8	6.1, 7.1	29
A-217	n=2	53, 59	31, 33	1.8, 2.3	6.4, 6.8	32
A-333		56	36	6.9	6.4	25
A-335		50	25	1.7	5.3	21
A-339		44	29	3.2	5.6	16
A-470		56	37	7.8	6.9	30
A-504		50	30	4.6	6.4	26
A-505		50	29	1.26	5.8	26
A-816		40	25	2.5	5.8	23

HABITAT. Grasslands; living in soil cracks.

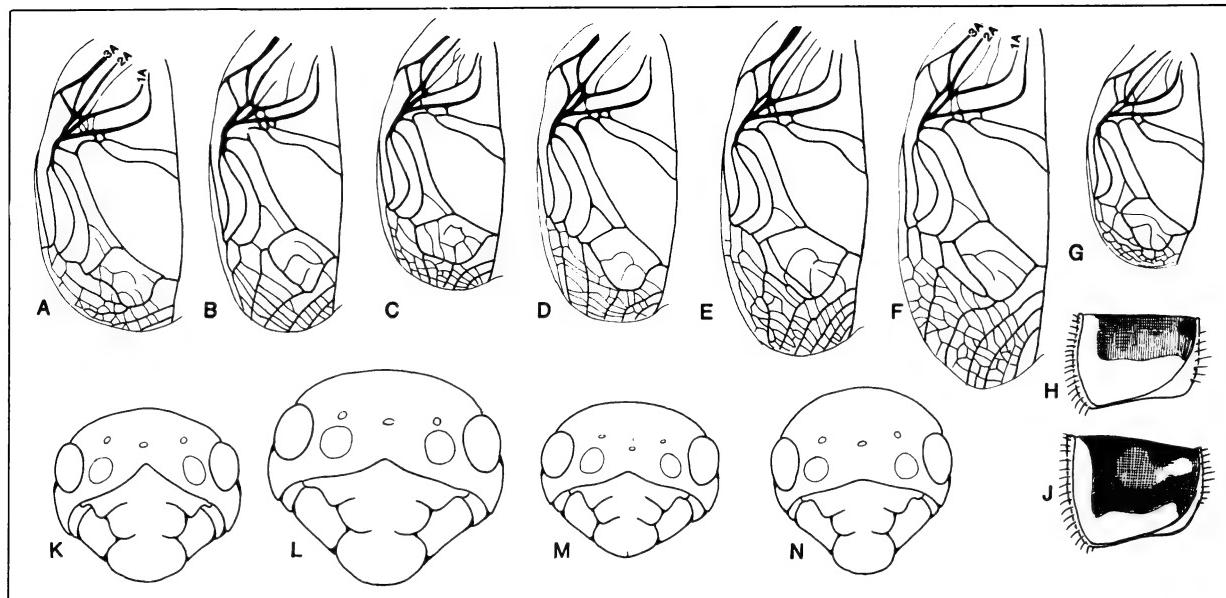


FIG. 86. *Aritella*, Ilya Group. A, *chidnaria* holotype; B, *fulviceps*; C, *cooma*; D, *girralonga* A-781; E, *gurrinya* holotype; F, *ilya*, holotype; G, *arya* holotype; H, *ilya* holotype lateral lobe; J, *fulviceps* lateral lobe; K, *cooma*, *ilya*, *gurrinya*, and *fulviceps*; L, *girralonga*; M, *arya*; N, *chidnaria*.

SPECIMENS. Type ♀ SM. A-68 1♀ ANC, 1♂ UM. A-71 1♀ ANSP. A-189 3♂ ANC. A-218 1♂ ANC. A-333 1♂ ANC. A-335 5♂ ANC. A-336 1♂ ANSP. A-339 3♂ ANC. A-470 3♂ 2♀ ANC. A-505 1♂ ANC. A-816 1♂ ANC. NORTHERN TERRITORY: 17.29S 133.30E, 8 km NNW of Elliott, 14 x 1972 (Upton) 2♀ ANC. Newcastle Waters, 5 vi 1929 (Campbell) 1♀ ANC. QUEENSLAND: 3 mi W Quilpie, 9 i 1964 (Chinnick) 1♀ ANC. 30 mi N Nocatunga, 10 ix 1949 (Riek) 1♀ ANC. 23.02S 139.18E, 62 km SW Boulia, 16 x 1978 (Upton) 1♂ 9♀ ANC.

LISTENING RECORDS. A-507, A-508.

Aritella cooma n. sp., Figs. 80, 86CK, 87BCD

RANGE. Mainly from interior of continent, across northern third and extending southwards into NSW. Often flies to lights in town.

RECOGNITION. Males: Body color orange to yellow, similar to *A. ilya* but veins in chordal and apical fields of FW not as contrasting yellow. File with 92–125 teeth ($n=16$). Mirror subdivided into at least 6 cells. Width of apical area of FW about half as wide as mirror. Head slightly wider than pronotum. Pronotum wider at front than at rear. Greatest pronotal width ca. 1.66 times pronotal length. FW ca. 2.6 times as long as pronotum. Femur III ca. 1.5 times as long as tibia III. Tibia III ca. 1.9 times as long as basitarsus III. Genitalia as in Fig. 87BCD. Holotype measurements: Body length 16.5 mm;

FW 7.6 mm; femur III 8.8 mm; tibia III 6 mm; cerci 12 mm.

File counts vary as follows: A-67 (94 teeth); 189 (94, 94, 94, 103, 122); 217 (111); 218 (94); 242 (101); 298 (119); 464 (97); 477 (97); 478 (102–105); 481 (103); 461 (118); 463 (92); 508 (92); 833 (97).

Females: Micropterous or macropterous. FW's 1.5 to 3.1 times as long as pronotum. Ovipositor ca. 0.8 times as long as femur III. Body length similar to males.

HOLOTYPE. ♂, A-189, Halls Creek, WA, 2 x 1968, ANC.

SONG. Fig. 84. Succession of chirps (8–15 pulses) with rather high pulse rate (50–70 p/s).

	p/s	ch/s	p/ch	kps	°C
A-67	59–65	3.3–4.6	9–11	5.8–6.5	29
A-68	49–61	1.3–2.8	7–9	5.6–6.2	28
A-71	52	3.1	9	6.1	28
A-189	64–67	3.6–4.0	7	5.9–6.2	29
A-207	60	4.7	5–7	6.1	32
A-217	65	2.7	8–9	6.2–6.8	32
A-218	63–65	3.1–4.0	8–9	5.1	30
A-242	57	3	9	5.5	27
A-298	52.5	2.2	9	5.0	18
A-335	50.6	2.3	11	6.2	21

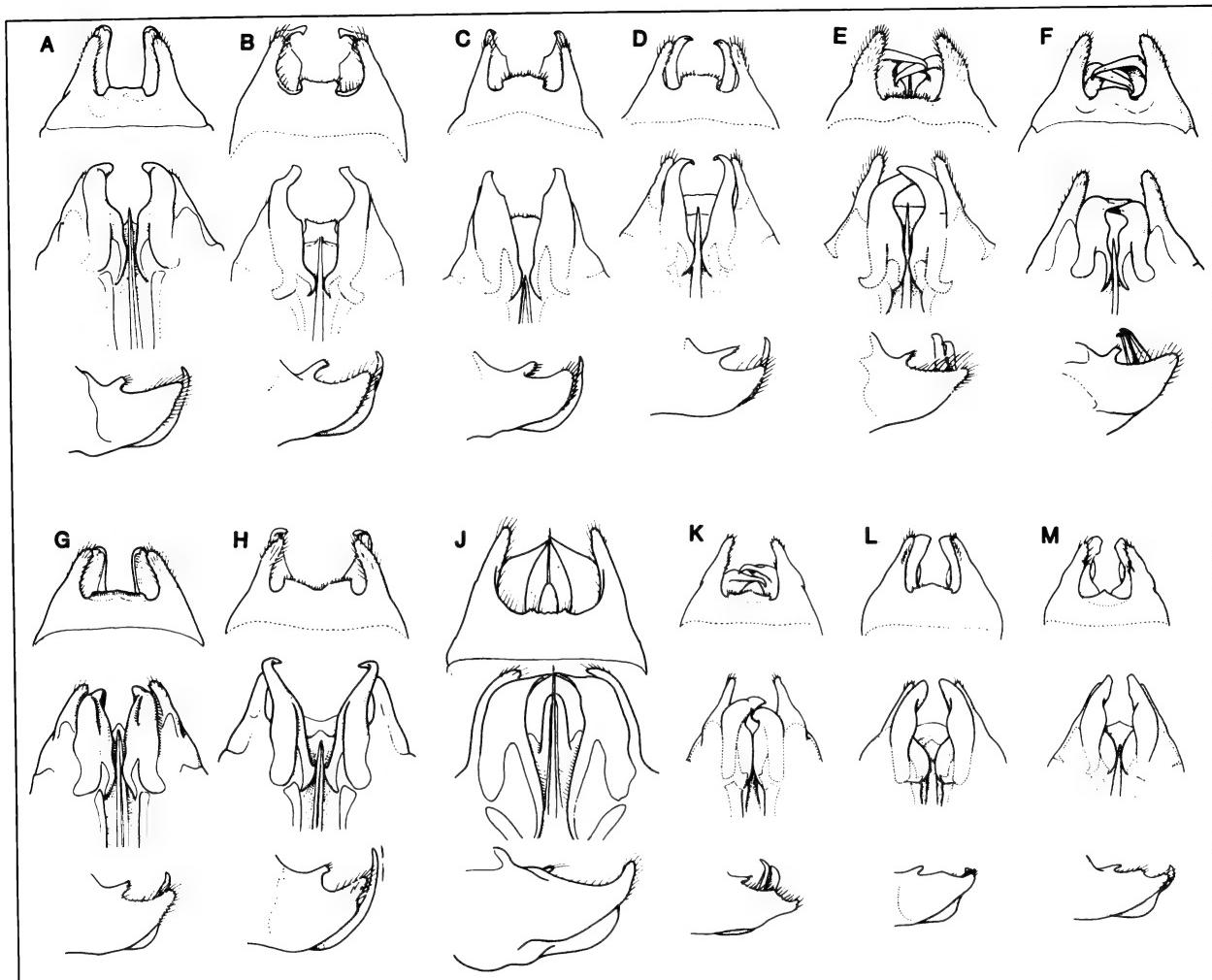


FIG. 87. *Aritella*, Ilya Group male genitalia (dorsal, ventral, lateral views arranged vertically). A, *ilya* holotype; B, *cooma* A-189; C, *cooma* A-43; D, *cooma* A-298; E, *gurrinya* A-68; F, *gurrinya* A-449; G, *fulviceps* A-68; H, *chidnaria* A-505; J, *girralonga* holotype; K, *arinya* A-99; L, *arinya* A-10; M, *arinya*.

	p/s	ch/s	p/ch	kps	°C
A-464	71-77	2.3-2.9	11-13	6.2	29
A-477	66	2.6	9	5.6	28
A-478	59	1.9	9	5.7	25
A-481	56	1.0	9	5.4	22
A-507	60	1.9	9	5.5	26
A-514	53	0.68	15	5.5	25
A-651	66, 67	2.3	10-12	5.3, 5.8	26

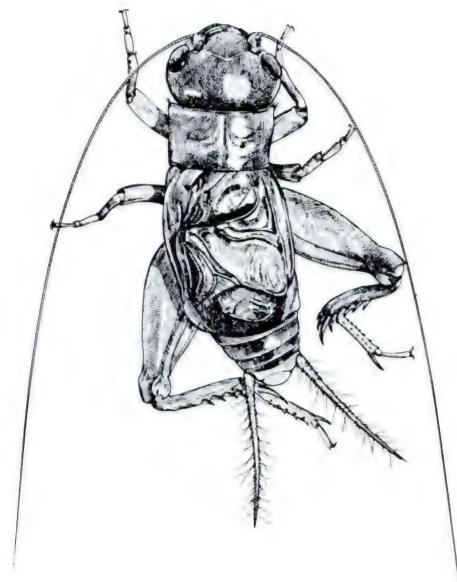
HABITAT. Grasslands throughout much of northern interior; often found hiding in soil cracks and crevices. Flies well and large numbers sometimes gather at lights.

SPECIMENS. Holotype ♂ ANC. A-43 1♂ ANC. A-67 1♂ ANC. A-189 3♂ ANC. A-207 1♂ ANC. A-218 1♂ ANC. A-242 1♂ ANC. A-298 1♂ ANC. A-335 1♂ ANC. A-461 1♂ ANC. A-463 1♂ ANC. A-464 1♂ 3♀ ANC. A-477 1♂ ANC. A-478 7♂ 4♀ ANC. A-481 3♂ 1♀ ANC. A-508 1♂ ANC. A-514 1♂ ANC. A-833 1♂ ANC.

QUESTIONABLE DETERMINATIONS. SOUTH AUSTRALIA: Innaminka ruins, 27 iv 1968 (Lewis) 1♂ 4♀ ANC. 26.20S 134.56E, 2 km SW Mt Barr, SSE Abminga, 25 ix 1972 (Key) 2♀ ANC.

WESTERN AUSTRALIA: 21.35S 117.04E, 1 km NNE Millstream H.S., 3 iv 1971 (Upton, Mitchell) 1♂ ANC. 3 mi N Coolawanya H.S., NW of Wittenoom, 21 iv 1963 (Chinnick) 1♂ ANC.

NORTHERN TERRITORY: Newcastle Waters, 3 vi 1929 (Campbell) 2♂ ANC. 17.29S 133.30E, 8 km NNW of Elliott, 14 x 1972 (Upton) 1♀ ANC. QUEENSLAND: 3 mi W Quilpie, 9 i 1964 (Chinnick) 2♀ ANC. 3 mi SW Toompine, 22 iv 1966 (Chinnick) 1♂ ANC. 4 mi E Camooweal, 12 v 1973 (Upton) 2♀ ANC.

FIG. 88. *Aritella arinya*.

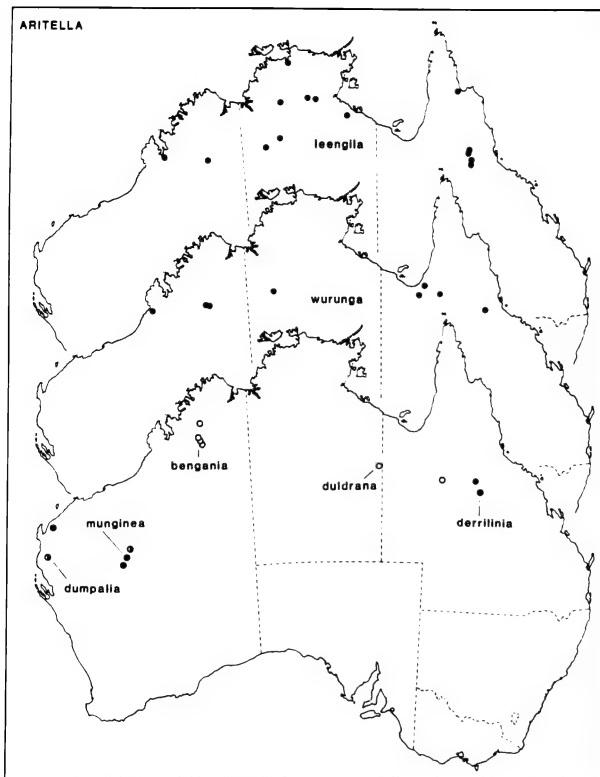
3 mi N Eromanga, 3 xi 1967 (Lewis) 1♂ ANC. 2 mi NE Noccundra, 28 i 1965 (Chinnick) 3♂ 4♀ ANC. Nocatunga, 10 xi 1949 (Riek) 1♂ ANC. 25 mi S Noccundra, 8 xi 1949 (Riek) 1♂ 3♀ ANC. 14 mi E Windorah, 20 iv 1966 (Chinnick) 3♀ ANC. 9 mi WNW Durham Downs, H.S., 18 iii 1964 (Chinnick) 1♂ 1♀ ANC. 19 mi E Durham Downs, H.S., 11 xi 1964 (Chinnick) 1♀ ANC. 25 mi E Durham Downs H.S., 11 xi 1949 (Riek) 1♀ ANC. 120 mi SSW Normanton, 14 x 1965 (Mesa, Sandulski) 1♂ ANC. 10 mi NE Tanbar H.S., 17 iii 1964 (Chinnick) 3♀ ANC. 46 mi SW Thargomindah, 12 i 1964 (Chinnick) 1♀ ANC. 4 mi N Barrington, 14 iii 1964 (Chinnick) 2♂ ANC. NEW SOUTH WALES: Coonabarabran, 1 xi 1967 (Key) 1♀ ANC. Willandra Bridge, 11 km N Moss-giel (33.16S 144.34E) 21 xii 1970 (Britton et al.) 1♀ ANC. Bourke, x 1909 1♂ BISH. Trangie Exp. Sta. 4 mi NNW Trangie, 13 xi 1968 (Lewis) 6♂ 15♀ ANC.

LISTENING RECORDS. A-242, A-255, A-258, A-473.

Aritella girralonga n. sp., Figs. 86DL, 87J

RANGE. Kimberley district, WA.

RECOGNITION. Males: Both individuals of this species were partly smashed as they were being collected. Pronotum slightly darker red than head. Bottom half of face pale ivory; top half reddish. Top margin of clypeus as in Fig. 86L. Disk of pronotum mostly reddish but becoming dark brown along lateral margins. Front margin with pale streak which narrows medially. Lateral lobes very pale in bottom half and front margin, and dark brown in top half (except along front margin). Pronotum slightly wider in front than in back. FW black along

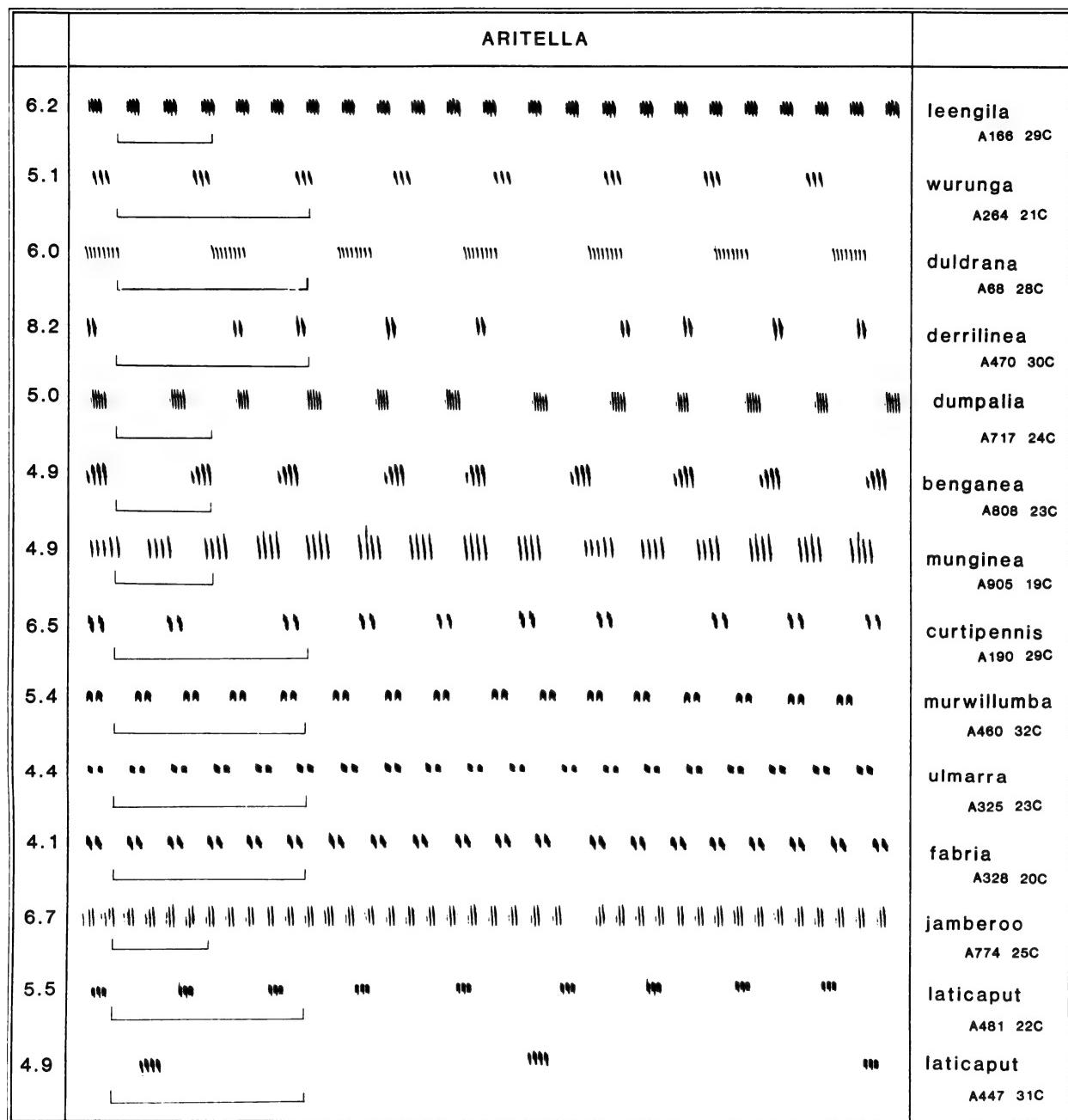
FIG. 89. *Aritella*, Leengila, Dumpalia, and Duldrana groups.

the Sc, pale between M and Cu₁, and brown in basal and apical areas. Veins in chordal and apical areas pale. File with 139 teeth (n=1). Veins in chordal and apical areas lighter than membrane. Mirror divided by a single vein which arches between posterior two veins. Width of apical area about 0.5 times medial length of mirror. Tibia III with 6 inner and 7 outer apical spurs. Femur III mostly yellow to orange. Genitalia as in Fig. 87J. Holotype measurements: Femur III ca. 1.6 times as long as tibia III. Tibia III 2.4 times as long as basitarsus III. Body length ca. 20 mm; FW length 8 mm; femur III 11 mm; tibia III 7 mm; cerci 13 mm.

HOLOTYPE. ♂, A-808, Leopold Downs, WA, 16 v 1969, ANC.

SONG. Fig. 84. Succession of 5 to 9-pulse chirps at roughly 3 ch/s at 25°C.

		p/s	ch/s	p/ch	kps	°C
A-781	n=2	38.0, 40.8	2.6, 2.9	5, 7	5.0, 5.3	23
A-806	n=2	48, 49	2.6, 2.8	5, 7	5.9	27
A-821		54	2.6	7-9	5.3	24

FIG. 90. *Aritella* songs. Scale = 0.5 s.

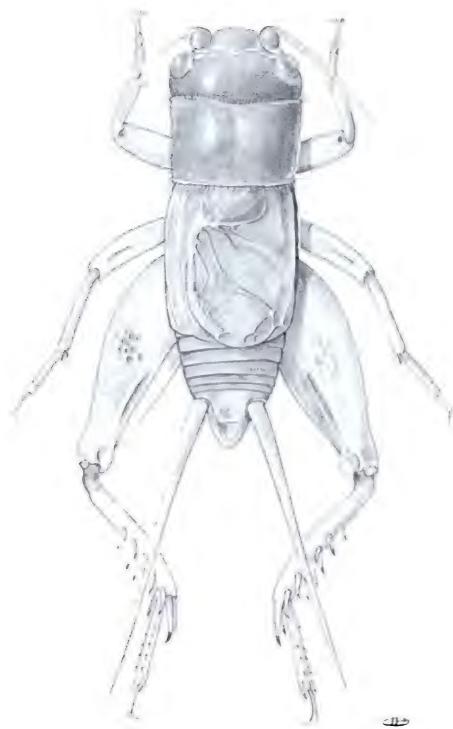
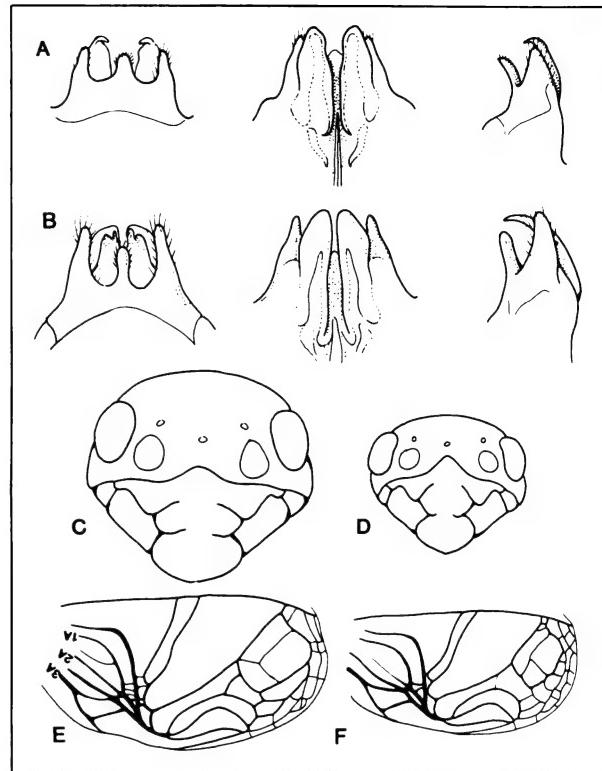
HABITAT. Found singing in soil cracks in open plains.

SPECIMENS. Holotype ♂ ANC. A-781 1♂ ANC.

Aritella arinya n. sp., Figs. 86GM, 87KLM, 88

RANGE. Central NT and most of interior of QLD, but reaching coast in vicinity of Townsville.

RECOGNITION. Males: Head orange. Top of pronotum mottled with brown against very pale yellowish background. Face yellow from median ocellus to middle of clypeus and whitish below that. Palpi white. Disk of pronotum darkest along posterior border, and becoming brown at lateral edges. Lateral lobe mostly whitish but with brown band

FIG. 91. *Aritella munginea*.FIG. 92. *Aritella*, *Dumpalia* Group. A, *munginea*; B, *bengania*; C, *dumpalia*; D, *munginea*; E, *dumpalia* holotype; F, *munginea*.

along top. Brown band interrupted at front by white band which runs along front margin. FW darkest in basal, chordal, and apical areas. Lateral field with brown band along and below Sc. File with 114–146 teeth ($n=11$). Mirror divided into 3 cells. FW about 2.25 times as long as pronotum. Dorsum of abdomen orange or brown; venter almost white. Cerci very pale. Legs I and II very pale. Femur III pale orange. Tibia III with 6 outer and 4 inner subapical spurs. Genitalia as in Fig. 87KLM. File counts vary as follows: A-10 (120, 130 teeth); 71 (114, 141); 99 (108); 242 (136); 457 (136, 142, 146, 146); 107 (118). Holotype measurements: Front of pronotum 1.08 times as wide as back. Pronotum 1.7 times as wide as long. FW 2.26 times as long as pronotum. File with 114 teeth. Body length 13.0 mm; FW length 5.2 mm; femur III 7.2 mm; tibia III 5.0 mm; cerci 8.7 mm.

Females: (A-457). FW's 1.42 times as long as pronotum and 0.45 times as long as femur III. Ovipositor 0.61 times as long as femur III and 1.92

times as long as pronotum. Body length ca. 14 mm; femur III 7.0 mm; cerci ca. 8.0 mm.

HOLOTYPE. ♂, A-10, Townsville, QLD, 28 viii 1968, ANC.

SONG. Fig. 84. Succession of trills of irregular length but usually 1 second in duration.

	p/s	kps	°C
A-10	24.2	5.25	21
A-71	29.0	6.85	28
A-99	26.7	6.20	21
A-242	30.0	6.10	27
A-255	33.3	6.35	26
A-457	32.8	6.7	32

HABITAT. Found in soil cracks and under stones in open grassy areas in open woodland.

SPECIMENS. Holotype ♂ ANC. A-10 2♂ ANC. A-71 1♂ ANC, 1♂ UM. A-99 1♂ ANC. A-107 1♂ ANSP. A-242 1♂ ANC. A-457 4♂ 1♀ ANC. 23.36S 133.34E, New Well Camp, 33 km WNW of Alice Springs, 30 ix 1979 (Rentz) 1♂ ANC.

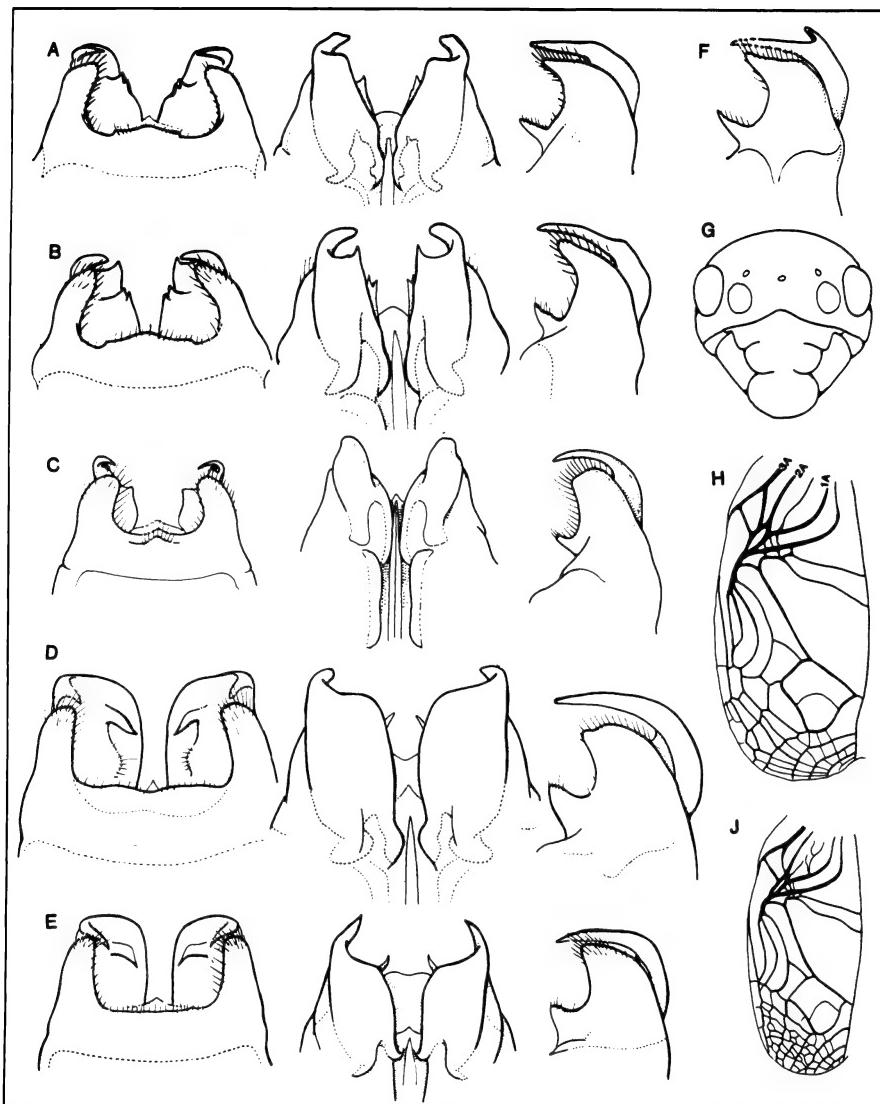


FIG. 93. *Aritella*, Leengila Group. A, *leengila* A-141; B, *leengila* A-166; C, *leengila*; D, *wurunga* A-252; E, *leengila* A-39; F, *leengila*; G, *leengila*; H, *wurunga* holotype; J, *leengila* holotype.

Aritella chidnaria n. sp., Figs. 86AN, 87H

RANGE. Two widely separated sites in WA and QLD. In northern WA only a song believed to belong to this species was obtained, but this may eventually prove to belong to another species.

RECOGNITION. Males: Coloration dark reddish-brown. Dorsum of head and pronotum about same in color. FW's nearly black in apical area. Face yellowish in ventral half. Clypeus rounded on top (as in *A. ulmarra*, Fig. 86N). Palpi pale. Side of

head yellowish below and immediately behind eye, but back of head behind eye dark brown. Pronotal disk largely dark red-brown; anterior margins with pale streak which narrows medially and finally disappears. Posterior lateral corners also with pale areas. Lateral pronotal lobes mostly dark brown, but entire anterior lower corner pale and with pale streak along anterior margin which ascends onto pronotal disk. Head about as wide as pronotum. Pronotum very slightly wider at front. FW about

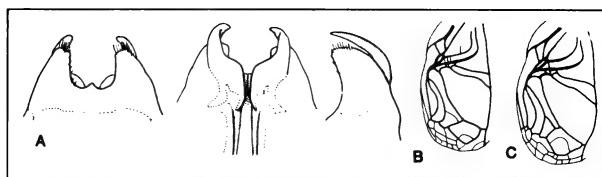


FIG. 94. *Aritella*, Duldrana Group. A, *duldrana* A-157; B, *derrilinea*; C, *duldrana* holotype.

2.3 times as long as pronotum. FW very dark, especially in chordal and apical areas. Veins at least as dark as membrane. Mirror with poorly defined posterior border; divided into 7–8 cells. File with 101–110 teeth ($n=2$). Femora I and II speckled with brown on external faces. Tibiae I and II brown, darker at base. Femur III speckled with dark brown on top and with prominent oblique stripes on top outer face. Tibia III dark reddish-brown and with 7 outer and 6 inner subapical spurs. Genitalia as in Fig. 87H. Holotype measurements: Body length 17 mm; FW 6.5 mm; femur III 9.5 mm; tibia III 60 mm; cerci broken.

HOLOTYPE. ♂, A-505, 19 miles northeast of Clermont, QLD, 21 ii 1969, ANC.

SONG. Fig. 84. Series of 3-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-505	50	4.8	3	6.5	26
A-803	40	4.4	3	8.4	23

HABITAT. Soil cracks in open grassy country.

SPECIMENS. Holotype ♂ ANC. A-505 1♂ ANC.

DUMPALIA GROUP

This group includes three species and can be distinguished from the other groups of Section A on the basis of the following combination of characteristics: Epiphallus with a prominent but very narrow central lobe (Fig. 92AB); mirror complete and partially or completely divided by one or more veins, upper margin of clypeus (front view) sometimes extends at least up to middle of antennal sockets (Fig. 92D).

dumpalia

1. Genitalia similar to *munginea* (Fig. 92C).
2. Song series of 5–6 pulse chirps.

munginea

1. Genitalia as in Fig. 92A.
2. Song series of 4-pulse chirps.

benganea

1. Genitalia as in Fig. 92B.
2. Song series of 4-pulse chirps.

Aritella dumpalia n. sp., Figs. 92CE

RANGE. Type locality in northwestern WA; song taped at A-901 tentatively assigned to this species.

RECOGNITION. Males: Dorsum of head and pronotum uniformly reddish-brown. Top margin of clypeus rounded as in *A. curtipennis*. Clypeus with medial pale streak extending upwards from labrum and with pale transverse band across middle. Disk of pronotum reddish-brown; lateral lobes dark above and pale in lower front corner and along front margin. Head slightly wider than pronotum. Pronotum slightly wider in front than in back. Pronotal width ca. 1.7 times its length. FW ca. 2.2 times as long as pronotum. FW darker brown, veins somewhat lighter than membrane. Mirror with dividing vein arching between two posterior mirror veins and with another vein connecting this dividing vein to front of mirror. Apical region of FW very narrow, in width about $\frac{1}{4}$ medial length of mirror. Tibia III with 6 inner and 6 outer subapical spurs. Basitarsus III with 8 outer and 7 inner dorsal spines. Genitalia very similar to *A. munginea* (Fig. 92A). Head 1.08 times as wide as pronotum. FW 2.2 times as long as pronotum. Body length 16 mm; FW length 7 mm; femur III 10 mm; tibia III 6 mm; cerci 12 mm.

HOLOTYPE. ♂, A-717, 57 miles northeast of Ashburton River, at Route 1, WA, 11 v 1969, ANC.

SONG. Fig. 90. Succession of 5–6 pulse chirps with first pulse very faint. Male from A-901 was only taped and may belong to different species.

	p/s	ch/s	p/ch	kps	°C
A-717 n=2	65–71	2.6–3.6	4–6	4.8–5.0	24
?A-901	43.4	1.2	6	3.5	19

HABITAT. Lightly wooded grassland.

SPECIMENS. Holotype ♂ ANC.

Aritella munginea n. sp., Figs. 91, 92ADF

RANGE. Northwestern WA.

RECOGNITION. Males: Head and pronotum uni-

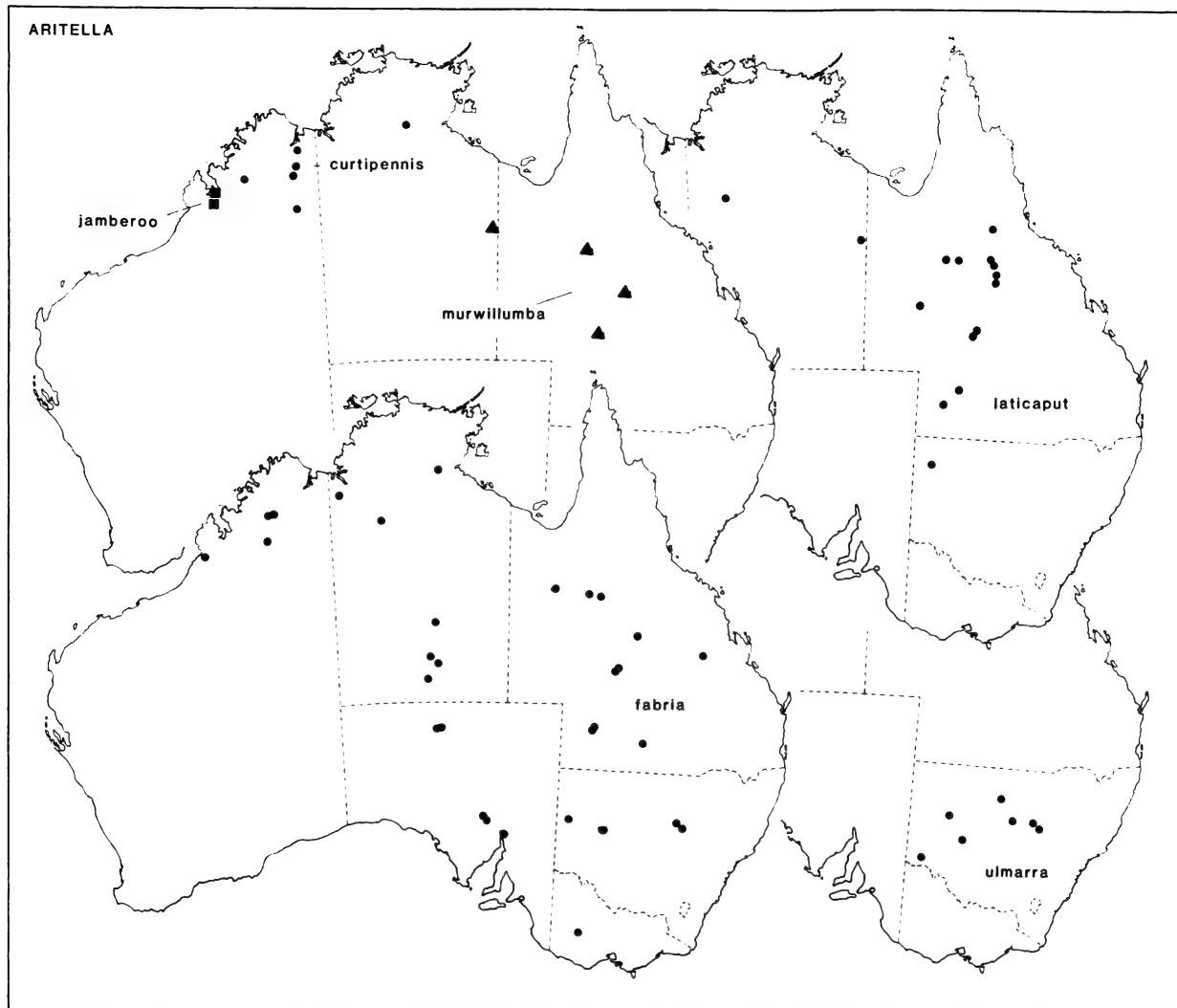


FIG. 95. *Aritella*, Miscellaneous Group distributions.

formly reddish. Pronotum (top view) with convex sides. Head 0.95 times as wide as pronotum. Pronotal width 1.67 times pronotal length. FW ca. 2.3 times as long as pronotum. Femur III ca. 1.5 times as long as tibia III. Tibia III ca. 2.4 times as long as basitarsus III. File with 79 teeth ($n=1$). Mirror divided into 3 or 4 cells. Width of apical area about 0.25 times medial length of mirror. Tibia III with 6 outer and 5 inner subapical spurs. Genitalia as in Fig. 92A. Body length 14 mm; FW length 5.7 mm; femur III 7.3 mm; tibia III 5.0 mm; cerci 7.0 mm.

Females: FW length about equal to median pronotal length. FW's slightly overlapping medially.

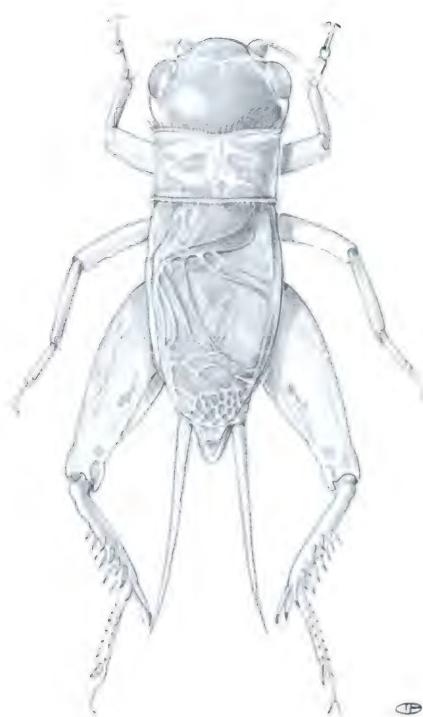
Ovipositor 1.1 times as long as femur III. Body length in dried specimen ca. 15 mm; femur III length ca. 8.5 mm.

HOLOTYPE. ♂, A-904, 26 miles south of Mundindiwindi, WA, 21 v 1969, ANC.

SONG. Fig. 90. Succession of 4-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-905 n=2	30	3.6, 3.7	4	4.8, 4.9	19

HABITAT. Collected along the Ashburton River and in grasslands.

FIG. 96. *Aritella fabria*.

SPECIMENS. Holotype ♂ ANC. Ashburton R, 23 mi S Onslow, WA, 30 viii 1964 (Carne) 1♂ 1♀ 1j ANC.

Aritella benganea n. sp., Fig. 92B

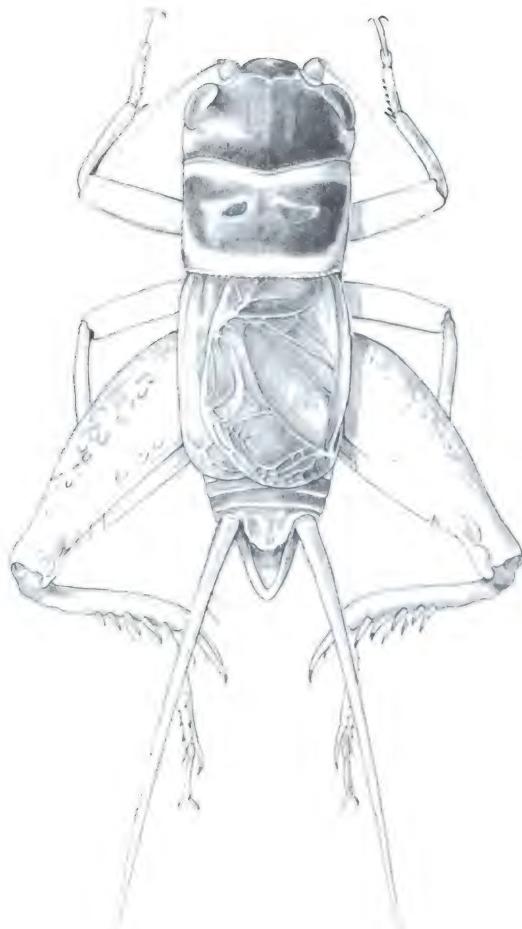
RANGE. Type locality in Kimberley district, WA.

RECOGNITION. Males: Only male representative smashed while being captured. However genitalia not damaged and very distinctive (Fig. 92B). Remains of FW indicate mirror divided and includes number of cells. Region between Sc and M veins dark brown. Tibia III has 7 outer and 6 inner subapical spurs. Basitarsus III has 6 inner and 6 outer dorsal spines.

HOLOTYPE. ♂, A-808, Leopold Downs, WA, 16 v 1969, ANC.

SONG. Fig. 90. Succession of 4-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-808	33-34	2.5-3.2	4	4.8-4.9	23
A-810	40	4.9	4	4.9	23
A-782	49	5.6	4	5.4	26
A-806	38	2.3	4	5.25	27

FIG. 97. *Aritella laticaput*.

HABITAT. Soil cracks in open grassy plains.

SPECIMENS. Holotype ♂ ANC.

LEENGILA GROUP

This group, comprised of a pair of species, possesses the following combination of characteristics: Insides of parameres possess spinelike projections. Femur III 10 mm or more in length. Mirror usually somewhat square and usually possesses a single major dividing vein which arches between the two posterior mirror veins (several smaller veins occur in a few specimens). Pronotal width less than 1.6

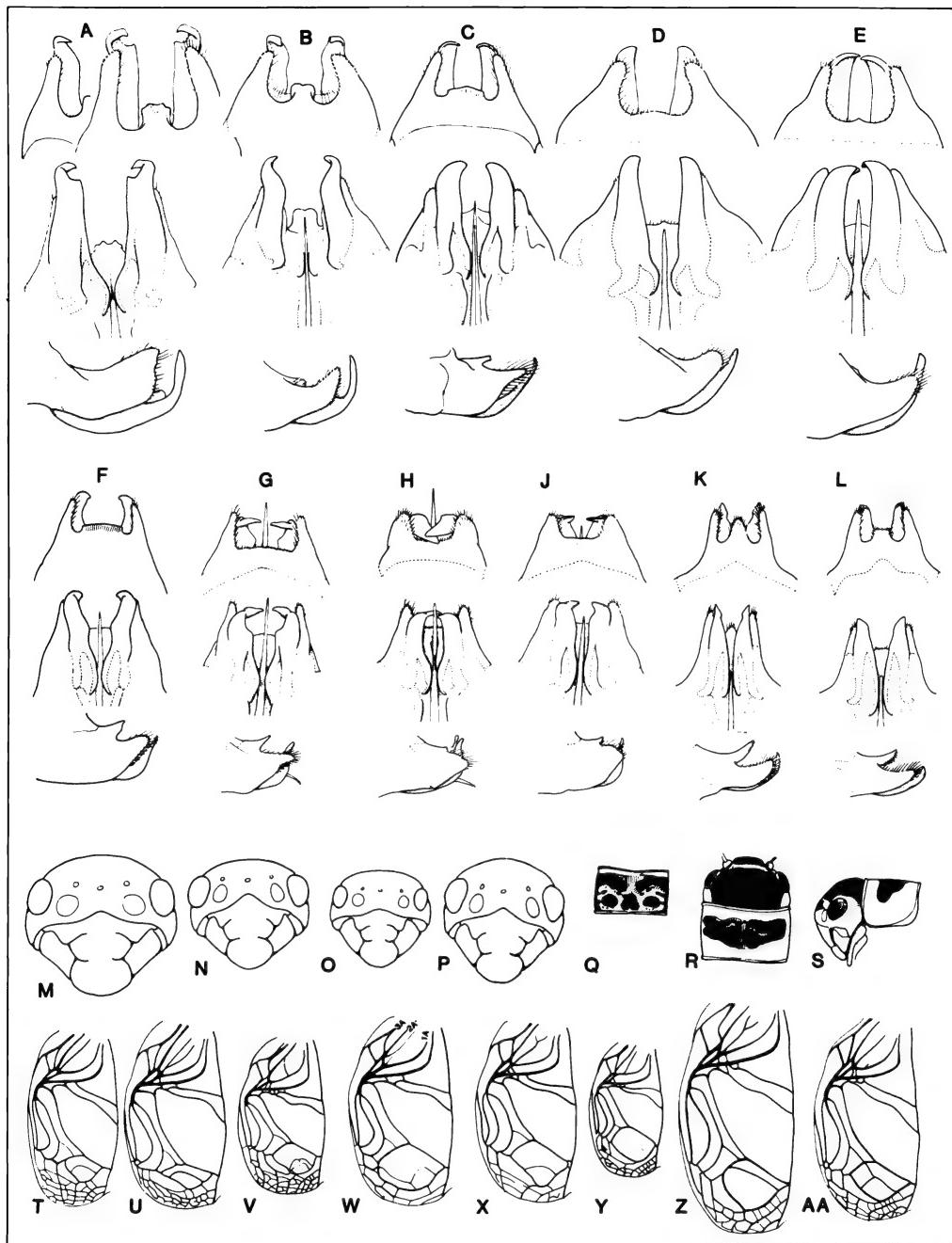


FIG. 98. *Aritella*, Miscellaneous Group. A, *curtipennis* (top left A-190, rest A-179); B, *curtipennis* A-116; C, *murwillumba* holotype; D, *ulmarra* A-325; E, *ulmarra* A-337; F, *jamberoo* A-774; G, H, J, *fabria*; K, *laticaput* A-67; L, *laticaput* A-207; M, *curtipennis*; N, *fabria*; O, *ulmarra*; P, *jamberoo*; Q, *murwillumba* pronotal disk; R, *laticaput*; S, *laticaput*; T, *jamberoo* holotype; U, *fabria* holotype; V, *ulmarra* holotype; W, *curtipennis* A-190; X, *curtipennis* A-61; Y, *murwillumba* holotype; Z, *laticaput* A-67; AA, *laticaput* A-469. G is from A-91, H is from A-67, J is from A-242.

times as great as pronotal length. FW's nearly twice as long as pronotum. Femur III about 1.5 times as long as tibia III, and tibia III is about 2.2 times as long as basitarsus III. Tibia III with 7 or 8 outer subapical spurs.

leengila

1. Genitalia as in Fig. 93ABCF.
2. Song series of 4-pulse chirps with pulse rate of more than 90 p/s between 21 and 26°C.
3. File with 94–118 teeth (n=12).

wurunga

1. Genitalia as in Fig. 93D.
2. Song series of 3-pulse chirps with pulse rate of less than 80 p/s between 21 and 26°C.
3. File with 102–104 teeth (n=5).

Aritella leengila n. sp., Fig. 93ABCEFGJ

RANGE. Kimberley district to base of Cape York Peninsula.

RECOGNITION. Males: Pronotal disk darker red than top of head, and uniformly reddish-brown and without pale band along front margin. Lateral lobes same color as disk, but lower front corner pale. Mirror with single dividing vein arching between two posterior mirror veins. File with 94–118 teeth (n=12). FW brownish, veins in chordal and apical areas same color as membrane. Head slightly wider than pronotum. Front of pronotum slightly wider than back. FW's about 2.0 times as long as pronotum. Genitalia as in Fig. 93. Legs pale tan. Tibia III with 8 outer and 6 inner subapical spurs. Basitarsus III with 5 inner and 8 outer dorsal spines. Holotype measurements: Femur III 1.46 times as long as tibia III. Tibia III 2.19 times as long as basitarsus III. Body length 18.5 mm. FW 7.0 mm; femur III 10 mm; tibia III 6.7 mm; cerci 11 mm.

Females: FW's short, from 1.39 to 1.47 times as long as pronotum and touching or barely overlapping medially. Ovipositor dorso-ventrally flattened, 0.55–0.75 times as long as femur III. Body length similar to males.

HOLOTYPE. ♂, A-141, Adelaide River near Humpty Doo, NT, 26 ix 1968, ANC.

VARIATION. A male from A-84 is quite pale and possesses a pale stripe connecting the lateral ocelli and another indistinct pale transverse band across the vertex just back of the eyes. Males from A-481 and 482 are very dark, with the top of the head and pronotum being almost black and with the tops of femora III being dark brown. Variation in genitalia

is shown in Fig. 93ABCEF. In females from A-481 and 482 the FW's are a little longer than the pronotum. The disk of the pronotum is somewhat mottled and a spike of white pigmentation extends onto the disk at the front margin. Some females have a pale stripe connecting the lateral ocelli. File counts of males vary as follows: A-39 (94 teeth); 141 (99); 166 (99); 206 (103); 213 (101); 218 (100); 481 (106, 107, 118); 482 (96–118).

SONG. Fig. 90. Succession of 4-pulse chirps delivered very rapidly; sometimes chirps are in groups.

	p/s	ch/s	p/ch	kps	°C
A-39	80	10.2	4	4.1	21
A-116 n=4	94–110	8.1–10.5	4	6.2–6.4	24
A-141	110	8.8	4	6.9	22
A-166 n=3	100–110	10.0–10.6	4	6.2	30
A-206 n=2	130	12.8, 13.5	4	6.5	33
A-213 n=2	110	9.5, 10.0	4	6.5, 6.7	33
A-218	135	13.7	4	6.7	32
A-481	100	9.3	4	6.2	22
A-830	110	9.0	4	6.5	22

HABITAT. At Adelaide River, NT, males found singing in clay cracks. North of Hughenden, QLD, males and females found on surface and not in burrows or soil cracks.

SPECIMENS. Holotype ♂ ANC. A-39 1♂ ANC. A-166 3♂ ANC. A-206 1♂ ANC, A-213 1♂ 1♀ ANC. A-218 1♂ ANC. A-481 2♂ 4♀ ANC, 1♂ ANSP. A-482 4♂ ANC. A-767 1♂ UM. 16.10S 136.15E, Goose Lagoon, 11 km SW by S Borroloola, NT, 31 x 1975 (Upton) 1♂ ANC.

LISTENING RECORDS. A-484, A-485.

Aritella wurunga n. sp., Fig. 93DH

RANGE. Southern Kimberley, WA to southern Cape York, QLD.

RECOGNITION. Males: Dorsum of head and pronotum similar in color, but pronotal disk patterned with lighter and darker areas. Pale streaks extend from lateral lobes onto disk along front margin. Lateral lobes mostly pale but dark on upper side. Head as wide as pronotum. Front of pronotum slightly wider than back and about 1.50 times as wide as the pronotal length. Mirror divided by vein which arches between two posterior veins. File with 102–104 teeth (n=5). FW about 2.0 times as long as pronotum. Apical area about 0.5 times as wide as medial length of mirror. Tibia III with 8

outer and 5 inner subapical spurs. Genitalia as in Fig. 93D. Male from Fitzroy Crossing, WA, almost entirely black with dark brown legs. Another from A-846 nearly black on top of head and pronotum. Genitalic variation shown in Fig. 93DH. Holotype measurements: Femur III 1.50 times as long as tibia III. Tibia III 2.22 times as long as basitarsus III. Body length 20 mm; FW 8 mm; femur III 11 mm; cerci 14 mm.

Females: (A-255). FW's 1.39 times as long as pronotum. Ovipositor 0.61 times as long as femur III. Body length ca. 18 mm; femur III length 10.5 mm.

HOLOTYPE. ♂, A-252, Flinders River, near Normanton, QLD, 6 x 1968, ANC.

SONG. Fig. 90. Succession of 3-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-252 n=2	65-66	3.5, 4.0	3	5.3, 5.4	27
A-255	70	5.0	3	5.5	26
A-264	62	3.8	3	5.1	21
A-263	66	3.6	3	5.3	21
A-760 n=2	70	4.2, 6.1	3	5.8, 6.3	19
A-816	70	5.6	3	6.5	23
A-846	70	3.4	3	3.9	26
A-207	60	5.4	3	5.4	32

HABITAT. In soil cracks in open country and near river banks.

SPECIMENS. Holotype ♂ ANC. A-255 1♂ 1♀ ANC, 1♂ ANSP. A-760 2♂ ANC. A-816 1♂ ANC. A-846 1♂ ANC.

DULDRANA GROUP

This group is comprised of a pair of species with the following distinguishing characteristics: Median lobe of epiphallus is a small pointed projection which cannot be seen from the side (Fig. 94AB). Body and legs blackish. Mirror complete and divided. Head narrower than pronotum. FW less than twice as long as pronotum. Tibia III about twice as long as basitarsus III.

duldrana

1. Genitalia as in Fig. 94A.
2. Thoracic plates between bases of legs dark brown.
3. Song succession of 7-pulse chirps.

derrilinea

1. Genitalia as in Fig. 94B.
2. Thoracic plates between bases of legs light brown.
3. Song succession of 2-pulse chirps.

Aritella duldrana n. sp., Fig. 94AC

RANGE. Two sites in central QLD and eastern NT.

RECOGNITION. Males: Body color entirely dark, appearing black but actually extremely dark maroon or red. Clypeus and labrum reddish. Palpi dark brown except for distal ends of last segments. Body reddish on venter of thorax. Head narrower than greatest pronotal width. Pronotum with convex sides; front roughly equal in width to back. Greatest pronotal width about 1.6 times its length. FW about 1.9 times as long as pronotum. Mirror complete, partially divided into cells by several incomplete veins. FW pale between Cu₁ and M veins. File with 94-123 teeth (n=3). Tibia III with 6 outer and 4 inner subapical spurs. Genitalia as in Fig. 94A. Holotype measurements: Femur III 1.56 times as long as tibia III. Tibia III 2.09 times as long as basitarsus III. Body length 12.2 mm; FW 9.0 mm; femur III 7.0 mm; tibia III 4.5 mm; cerci broken. File with 101 teeth.

HOLOTYPE. ♂, A-68, Nelia, QLD, 16 ix 1968, ANC.

SONG. Fig. 90. Succession of ca. 7 pulse chirps with pulse rate over 100 per second at 28°C.

	p/s	ch/s	p/ch	kps	°C
A-68	84	4.0	8	5.6	28

HABITAT. Open grey soil plains.

SPECIMENS. Holotype ♂ ANC. A-71 2♂ ANC.

Aritella derrilinea n. sp., Fig. 94B

RANGE. Type locality in east central QLD.

RECOGNITION. Males: Very similar to *A. duldrana*, even in shape of genitalia. Body color very dark reddish-brown; superficially blackish in appearance. Cerci pale brown, and area between bases of cerci also pale. Mirror divided by single vein which arches sharply between two posterior mirror veins. Venter of abdomen light brown. File with 94-106 teeth (n=4). Head narrower than widest part of pronotum. Front and back of pronotum equal in width. Greatest pronotal width 1.62 times pronotal length. FW about 1.8 times as long as pronotum. Tibia III with 6 outer and 5 inner subapical spurs. Holotype measurements: Femur III 1.51 times as

long as tibia III. Tibia III 1.96 times as long as basitarsus III. Body length 13 mm; FW 3.7 mm; femur III 6.2 mm; tibia III 4.3 mm; cerci 6.7 mm.

HOLOTYPE. ♂, A-470, 55 miles south of Hughenden, QLD, 15 ii 1969, ANC.

SONG. Fig. 90. Succession of 2-pulse chirps at roughly 3 chirps per second at 30°C and with rapid pulse rate.

	p/s	ch/s	p/ch	kps	°C
A-470	74	3.8 avg.	2	8.2	30

HABITAT. Open grassland.

SPECIMENS. Holotype ♂ ANC. A-470 4♂ ANC.

LISTENING RECORDS. A-474. A-67.

MISCELLANEOUS GROUP

This group is a loose assemblage of five species which are distinctive in themselves and which are placed together only because they do not easily fit into any other group within Section A. All species possess a complete mirror which is wholly or partially divided by a single vein arching between the two posterior mirror veins. The best way to identify a species belonging to this group is to compare the genitalia with figures given for this section.

KEY TO SPECIES OF MISCELLANEOUS GROUP

1. FW more or less transparent and with dark brown veins.
Genitalia as in Fig. 98C *murwillumba*
FW and genitalia not as above 2
2. Parameres almost hook-shaped and central process of epiphallus prominent and narrow (Fig. 98AB) ... *curtipennis*
Parameres and epiphallus not as above 3
3. Femur III 10 mm or more in length. Genitalia as in Fig. 98DE *ulmarra*
Femur III length less than 9 mm. Genitalia not as above 4
4. Body length less than 16 mm. Genitalia as in one of Fig. 98GHJ *fabria*
Body length more than 16 mm. Genitalia as in Fig. 98F *jamberoo*

Aritella murwillumba n. sp., Fig. 98CQY

RANGE. Central QLD and extreme eastern NT.

RECOGNITION. Males: Dorsum of head uniformly reddish. Pronotal disk mottled brownish. Lateral lobes mostly dark brown in dorsal half, pale in ventral half and along front margin. Head as wide as pronotum. Pronotum as wide in front as in back.

Greatest pronotal width ca. 1.6 times pronotal length. FW's pale and transparent, but veins dark brown. Mirror complete and undivided (see Variation). Width of apical area of FW about half medial length of mirror. File with 138–168 teeth (n=5). FW about 2.8 times pronotal length. Femora I and II pale and with small round brown spots at bases of setae and with larger dark markings on outer faces and near distal end. Femur III spotted on top, and with a large irregular reddish marking on inner and outer faces. Tibia III with 6 inner and 7 outer subapical spurs. Genitalia as in Fig. 98C. Holotype measurements: Femur III 1.6 times as long as tibia III. Body length ca. 18 mm, FW 9.5 mm, femur III 9.7 mm, tibia III 6.5 mm, cerci broken.

VARIATION. Two males from A-460 believed to belong to this species have transparent FW's but they lack dark veins. The genitalia are also somewhat different, and the pronotum is not mottled as in the holotype. They also lack large pigmented markings on the side of femur III. The mirror in the holotype is not divided, but is divided in some paratype individuals by a single vein which arches between the two posterior veins. File counts vary as follows: A-67 (144, 150 teeth); 460 (138, 142); 467 (168).

HOLOTYPE. ♂, A-67, 25 miles west of Richmond, QLD, 16 ix 1968, ANC.

SONG. Fig. 90. Rapid succession of 2-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-67 n=5	41-44	9.2-10.0	2	7.2-7.7	31
A-67	—	—	2	—	31
A-71 n=2	50	10.7, 10.9	2	5.4	28
A-467 n=2	44, 46	8	2	6.1, 6.2	34
A-460	42	7.7	2	5.4	32

HABITAT. Soil cracks in red or grey soil plains.

SPECIMENS. Holotype ♂ ANC. A-67 1♂ ANC. A-460 2♂ ANC. A-467 1♂ ANSP.

LISTENING RECORDS. A-463.

Aritella fabria n. sp., Figs. 96, 98GHJNU

RANGE. Widespread through continental interior and ranging northwestwards into Kimberley district. Perhaps represents 2 or 3 species.

RECOGNITION. Males: Somewhat similar to *A.*

arinya but mirror very narrow (Fig. 98U) and genitalia somewhat different (Fig. 98GHJ). Pronotal disk almost uniformly orange, without brown pigmentation along posterior border. Veins in chordal and apical areas of FW pale, much lighter than surrounding membrane. File with 111–147 teeth ($n=18$). Head slightly wider than pronotum. Front of pronotum slightly wider than rear. FW about 2.5 times as long as pronotum. Holotype measurements: Femur III 1.60 times as long as tibia III. Body length 15 mm, FW 6.5 mm, femur III 8.5 mm, tibia III 5 mm. File with 140 teeth.

Females: FW's 1.58 to 1.64 times as long as pronotum. Ovipositor 0.46 to 0.50 times as long as femur III. Body length 13–15 mm; femur III ca. 7.5 mm.

VARIATION: Two genitalic types occur among the individuals we collected and believe to belong to the same species. These are shown in Fig. 98GHJ. Males from A-83, 91 and 760 had genitalia with the more pointed epiphalllic lobe (side view). File counts vary as follows: A-67 (128 teeth); 68 (125, 134, 140); 71 (127); 83 (114); 91 (111, 120); 171 (133); 242 (104, 134); 328 (119); 334 (140); 395 (112); 441 (124); 509 (120); 336 (147); 386 (122).

HOLOTYPE. ♂, A-68, Nelia, QLD, 16 ix 1968, ANC.

SONG. Fig. 90. Succession of very rapid 2-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-68 n=2	55	12.1, 12.2	2	5.7, 5.8	29
A-83	33	6.6	2	4.6	18
A-91 n=2	40, 44	9.7, 10.3	2	4.7, 5.0	21
A-91 n=2	33, 35	7.7, 8.2	2	4.4, 4.8	18
A-171	55	11.5	2	5.4	24
A-213 n=2	50, 57	10.8, 11.2	2	5.2, 5.3	33
A-221	54	5.9	2	6.5	30
A-242	55	12.0	2	6.0	27
A-328	43	9.3	2	4.1	19
A-334	55	12.2	2	5.1	24
A-384	55	12.4	2	5.4	30
A-395	49	10.7	2	5.3	26
A-422	43	9.5	2	4.7	14
A-441	51	10.3	2	5.0	27
A-464	57	11.7	2	5.7	29
A-509	46	9.1	2	5.5	26
A-610	53	10.6	2	5.0	27
A-760 n=3	37	7.3–7.8	2	4.8	19
A-781 n=3	46–50	9.6–11.8	2	5.3–5.8	23
A-782	50	12.0	2	5.6	23
A-808	50	11.0	2	5.7	23

HABITAT. Open grasslands and open eucalypt woodlands. Usually found singing in soil cracks or under stones.

SPECIMENS. Holotype ♂ ANC. A-67 1♂ ANC. A-68 2♂ 1♀ ANC. A-71 3♂ ANC. A-83 1♂ ANC. A-91 2♂ ANC. A-171 1♂ ANC. A-242 2♂ ANC. A-328 1♂ 1♀ ANSP. A-334 1♂ ANC. A-336 1♂ ANC. A-386 1♂ ANC. A-395 1♂ 1♀ ANC. A-441 1♂ ANC. A-464 1♂ ANC. A-467 1♂ UM. A-509 1♂ ANC. A-635 1♂ ANC. A-760 2♂ ANC. NORTHERN TERRITORY: 24.11S 134.01E, Ooraminna Camp, 56 km S by E of Alice Springs, 23 ix 1978 (Rentz) 3♂ 1♀ ANC. 23.41S 134.15E, 39 km E Alice Springs, 25 ix 1978 (Rentz) 2♂ ANC. 23.38S 133.53E, Junction Waterhole, Todd R, 9 km NE of Alice Springs, 28 ix 1978 (Rentz) 1♂ ANC. QUEENSLAND: 27.35S 145.51E, 4 km S Ardrossan HS, near Wyandra, 28 ix 1977 (Rentz, White) 1♂ ANC. SOUTH AUSTRALIA: 27.03S 134.22E, 45 km NE Welbourne Hill, 20 ix 1978 (Rentz) 2♂ ANC.

LISTENING RECORDS. A-454, A-455.

Aritella curtipennis (Mjöberg), Fig. 98ABWX

Gryllodes curtipennis Mjöberg 1913: 33. Holotype ♂, Kimberley district, NW Australia (Mjöberg) sm. Transferred to *Gryllulus* by Chopard 1951: 416. Type examined.

RANGE. Kimberley district and northern NT.

RECOGNITION. Males: Body color reddish. Upper margin of clypeus rounded, slightly more bowed than in *A. ulmarra*. Lower third of clypeus and labrum pale yellowish. Upper end of clypeus immediately below antennae dark reddish-brown. Palpi pale. Disk of pronotum uniformly reddish, about same color as top of head. Lateral lobes mostly reddish but front lower corner pale; gradual transition from red to pale. Upper half of lateral lobes with setae; caudally some setae very large. Front of pronotum ca. 1.2 times as wide as rear. Greatest pronotal width about 1.8 times the pronotal length. FW brownish. Mirror complete and undivided. File with 134–158 teeth ($n=5$). FW about 2.4 times as long as pronotum. Legs uniformly pale reddish-brown. Tibia III with 6 inner and 6 outer subapical spurs. Basitarsus III with 6 inner and 7 outer spines. Femur III ca. 1.4 times as long as tibia III. Genitalia as in Fig. 98AB. Body length ca. 18 mm, FW ca. 6.5 mm, femur III ca. 9.8 mm, tibia III ca. 6.4 mm, cercus longer than 8 mm.

Females: (Based on one female from A-116.) Very similar to males in color. FW's slightly longer than pronotum and just barely overlapping medially. Ovipositor 0.7 times as long as femur III.

VARIATION. The genitalia vary somewhat across the range of the species (Fig. 98AB). At A-116 a

male has the mirror divided by a single vein, and the lower half of the lateral lobes are clearly darker than the disk. File counts vary as follows: A-116 (135, 158 teeth); 190 (134); 179 (157); 790 (140).

SONG. Fig. 90. Succession of 2-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-116	40	5.4	2	6.3	24
A-190 n=5	37-41	4.9-5.0	2	6.8-7.0	30

HABITAT. Soil cracks in open flat country.

SPECIMENS. Holotype ♂ SM. A-116 2♂ ANC. A-179 1♂ ANC. A-190 1♂ ANC. A-790 1♂ ANSP.

LISTENING RECORDS. A-184, A-188.

Aritella ulmarra n. sp., Fig. 98DEOV

RANGE. Murray-Darling Basin, NSW.

RECOGNITION. Males: Large, body length more than 20 mm. Head and pronotum roughly equal in color. In some specimens pronotum lighter than head, in others darker. FW veins slightly darker than surrounding membrane. Clypeus rounded on top (Fig. 98O). Face darkly pigmented just below antennae. Top half of clypeus red like dorsum of head; bottom half pale. Labrum reddish. Pronotum as wide in front as in back, wider in front in some specimens. Head slightly wider than pronotum. Greatest pronotal width about 1.7 times pronotal length. FW about 2.9 times as long as pronotum. Mirror divided into several incomplete cells in posterior half. Apical area of FW slightly more than $\frac{1}{2}$ medial length of mirror. File with 92-153 teeth (n=13). Femur III about 1.6 times as long as tibia III, the latter is about 2.1 times as long as basitarsus III. Tibia III with 5-6 outer and 5 inner subapical spurs. Basitarsus III with ca. 10 outer and ca. 6 inner dorsal spines. Holotype measurements: Body length 22 mm; FW length 11 mm; femur III 11.6 mm; tibia III 7.2 mm.

VARIATION. File counts of males vary as follows: A-325 (106, 114, 121, 124 teeth); 330 (121); 336 (134); 436 (128); 331 (103, 104); 337 (140, 143, 153).

HOLOTYPE: ♂, A-325, 90 miles south of Wilcannia on road to Ivanhoe, NSW, 27 xii 1968, ANC.

SONG. Fig. 90. Succession of 2-pulse chirps. Singing at night in red soil from small openings apparently excavated from beneath rain-clogged soil cracks.

	p/s	ch/s	p/ch	kps	°C
A-325 n=2	41, 43	9.1, 9.2	2	4.3, 4.4	23
A-330	38	6.7	2	4.5	20
A-336 n=3	32-34	6.2-7.0	2	4.8-5.0	19
A-436	40	6.5	2	4.5	23

HABITAT. Red soils in open eucalypt woodland. Found singing from holes and crevices.

SPECIMENS. Holotype ♂ ANC. A-325. 3♂ ANC. A-330 1♂ ANC. A-331 2♂ ANC. A-336 1♂ ANSP. A-337 2♂ ANC, 1♂ UM. A-436 1♂ ANC. 20 mi SE Bourke, 27 x 1949 (Riek) 2♂ ANC.

Aritella jamberoo n. sp. Fig. 98FPT

RANGE. Vicinity of Derby, Kimberley district, WA.

RECOGNITION. Males: Dorsum of head uniformly reddish. Pronotum yellowish, mottled with brown. Upper half of clypeus yellow, bottom half and labrum almost white. Upper margin of clypeus (Fig. 98P) slightly more angulate than *A. murwillumba*. Lateral lobes of pronotum mostly pale and with narrow brown band along upper side. Pronotal disk yellowish, but darker brown in posterior section. Head slightly wider than pronotum. Front of pronotum slightly wider than rear. Greatest pronotal width about 1.9 times pronotal length. FW about 2.8 times as long as pronotum. FW dark brown, much darker than head, pronotum, or abdomen. Mirror divided into 3 cells. Width of apical area of FW about equal to medial length of mirror. Veins in chordal, mirror, and apical areas slightly paler than membrane. Legs pale, yellowish. Tibia III with 6 inner and 6 outer spurs. Basitarsus III with 7 outer and 6 inner dorsal spines. Dorsum of abdomen blotched with light and dark areas: three broad longitudinal brown bands, one along each lateral edge (top view) and less distinct medial band. Dorsum of abdomen generally much darker in last 2 segments before cerci. Venter of abdomen very pale. Subgenital plate with two brown spots. Genitalia as in Fig. 98F. Holotype measurements: Femur III 1.63 times as long as tibia III. Tibia III 2.08 times as long as basitarsus III. Body length 15.3 mm; FW length 6.5 mm; femur III 8.0 mm; tibia III 5 mm; cerci more than 7 mm.

HOLOTYPE. ♂, A-774, Derby, WA, 14 v 1969, ANC.

SONG. Fig. 90. Series of 3-pulse chirps with first pulse of each chirp less intense.

	p/s	ch/s	p/ch	kps	°C
A-774 n=3	54.2–61.0	9.5–10.7	3	6.7–6.9	25

HABITAT. Roadside grasses.

SPECIMENS. Holotype ♂ ANC. A-767 1♂ ANC.

Aritella laticaput (Chopard), Figs. 97, 98KLRSZAA

Gryllulus laticaput Chopard 1951: 419. Holotype ♂, 23 mi W of Dajarra, QLD, ix 1930 (T. Hodge-Smith) AM. Examined.

Gryllopsis armatipes Chopard 1951: 421. Holotype female, Alexandria, South Australia, Jan. 1906 (W. Stalker) BM. Type examined. NEW SYNONYM.

RANGE. Central QLD to northwestern NSW and central NT.

RECOGNITION. Males: Genitalia as in Fig. 98KL. Dorsum of head dark reddish-brown and usually with pale band connecting lateral ocelli. Pronotal disk red-brown in center and with broad pale bands across front and back (Fig. 98RS). Face generally pale; yellowish from median ocellus down to clypeus, then ivory to bottom of labrum. Side of head yellowish below and behind eye, becoming dark brown above eye. Lateral lobes partially to entirely pale (Fig. 98S). FW venation as in Fig. 98ZAA. Mirror usually with single dividing vein running parallel to anterior-lateral mirror vein (Fig. 98Z). File with 103–116 teeth; holotype with 105 teeth. Veins in apical and chordal areas lighter than membrane. Dorsum of abdomen brown medially and becoming yellowish at lateral borders. Venter of abdomen pale. Legs pale. Head about as wide as front of pronotum. Front of pronotum slightly wider than rear. Front pronotal width about 1.6 times pronotal length. FW about 2.3 times as long as pronotum. Femur III about 1.5 times as long as tibia III. Body length about 18.0 mm; FW about 8.5 mm.

Females: FW's very short, shorter than the length of pronotum, triangular in shape (top view) and barely overlapping medially. FW ca. 0.79 times as long as pronotum. Ovipositor 1.28 times as long as femur III. Body length 17–20 mm; femur III length 10–12 mm.

SONG. Fig. 90. Sequence of 3- or 4-pulse chirps, sometimes widely spaced.

	p/s	ch/s	p/ch	kps	°C
A-67 n=4	43–51	2.1–3.6	4	4.6–4.7	29
A-71 n=3	48–56	2.4–3.4	3–4	4.6–4.7	28
A-447 n=3	70–80	ca. 2.0	4	4.9–5.0	31

	p/s	ch/s	p/ch	kps	°C
A-451	76.5	0.85	4	4.75	31?
A-464	66	5.5	3	5.4	29
A-481 n=2	66, 74	1.4, 4.2	3	5.5	22

HABITAT. Soil cracks and crevices in open flat plains over much of northern Australia.

SPECIMENS. Holotype ♂ AM. A-67 1♂ ANC. A-68 5♂ 1♀ ANC. A-207 1♂ ANC. A-457 4♂ 3♀ ANC. A-464 1♂ 1♀ ANC. A-465 1♀ ANC. A-469 7♂ 8♀ ANC. A-470 2♂ ANC. A-474 1♂ ANC. QUEENSLAND: Mt. Skipper, 80 mi E Boulia, 15 v 1972 (Monteith) 1♂ UQC.

LISTENING RECORDS. A-473, A-457.

PICTORINA n. gen.

TYPE SPECIES. *Pictorina bullawarra* n. sp.

This genus includes 5 species. In eastern Australia four species were found in hilly or mountainous country among grasses in eucalyptus woodland. The fifth species was taken in the Northern Territory.

RECOGNITION. Members of genus possess following combination of characteristics: Mirror not divided into cells (except *P. rimbijae*). Veins 2A and 3A connected by two veins in basal area (Fig. 102) (character shared with *Aritella*). Mirror usually connected to vein Cu₁ by rather long vein. Apical area of FW very narrow front to back (Fig. 102G–K). Pronotal disk dark centrally and with broad bands along front and rear margins (Fig. 102EFM). Top of head often almost black. Differs from *Rufoccephalus* mainly by genitalia (Fig. 102ABCD).

bullawarra

1. File with 103–122 teeth.
2. File with 47–50 teeth per mm near center.
3. Tibia III with 6 outer and 4 inner subapical spurs.
4. Pronotal width/pronotal length less than 1.6.

kobarina

1. File with 119–142 teeth.
2. File with 34–41 teeth per mm near center.
3. Tibia III with 5 outer and 4 inner subapical spurs.
4. Pronotal width/pronotal length more than 1.7.

yerriyari

1. File with 122 teeth.
2. File with 59 teeth per mm near center.
3. Tibia III with 5 outer and 4 inner subapical spurs.
4. Pronotal width/pronotal length more than 1.7.
5. Connecting vein between Cu₁ and mirror short (Fig. 102K).

wombalano

1. File with 90–99 teeth.

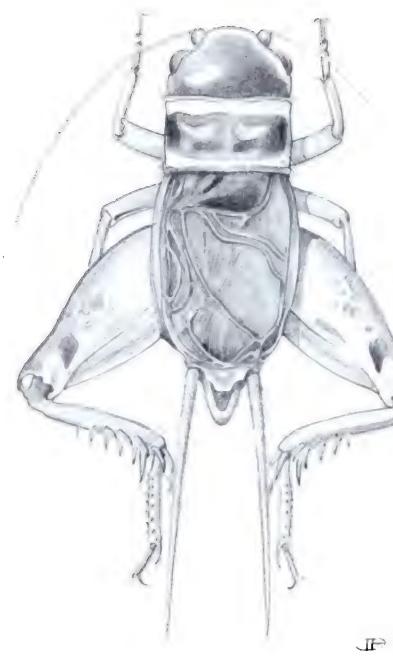


FIG. 99. *Pictorina kobarina*.

- 2. File with 33–38 teeth per mm near center.
 - 3. Tibia III with 5 outer and 4 inner subapical spurs.
 - 4. Pronotal width/pronotal length more than 1.7.
- rimbjae*
- 1. File with 90 and 117 teeth.
 - 2. Spacing of teeth not recorded.
 - 3. Tibia III with 5 outer and 4 or 5 inner subapical spurs.
 - 4. Mirror divided (unlike all other species).
 - 5. Genitalia as in Fig. 102D.

Pictorina bullawarra n. sp., Fig. 102AFGM

RANGE. Mountains west and northwest of Townsville, QLD.

RECOGNITION. Males: Dorsum of head black. Face reddish. Side of head reddish. Side of head and pronotum as in Fig. 102F. Head as wide as front of pronotum. Front of pronotum as wide as rear and about 1.5 times as wide as pronotal length. FW about 2.5 times as long as pronotum. Lateral field of FW nearly black in top half, pale in bottom half. File with 103–122 teeth (n=5). Dorsum of abdomen brown, becoming black in last segments before the cerci. Legs I and II pale and with scattering of black hairs and setae. Femur III reddish, with distinct large black spot on inner face at base of 4th

quarter, and row of brown spots before that. Tibia III dark along lower edge, with 6 outer and 4 inner subapical spurs. Holotype measurements: Femur III 1.57 times as long as tibia III. Tibia III 1.87 times as long as basitarsus III. Genitalia as in Fig. 102A. Body length 13.5 mm, FW 5.8 mm, femur III 8.1 mm, tibia III 5.6 mm, cerci 8.5 mm.

VARIATION. In a male from A-484 the top of the head is dark red-brown and the file bears 112 teeth. In a male from A-280 the file has 103 teeth.

HOLOTYPE. ♂, A-267, Mount Stuart, Townsville, QLD, 21 x 1968, ANC.

SONG. Fig. 101. Complex short trills comprised of succession of more intense 2-pulse units preceded by less intense pulse.

	p/s	ch/s	p/ch	trill/s	kps	°C
A-267 n=2	60	17	3	0.83	5.4, 5.5	23
A-483	66	18	3	0.9	4.7	24

HABITAT. Dry grassy areas in open eucalypt woodlands on mountain side.

SPECIMENS. Holotype ♂ ANC. A-267 2♂ ANC. A-280 1♂ UM. A-484 1♂ ANSP.

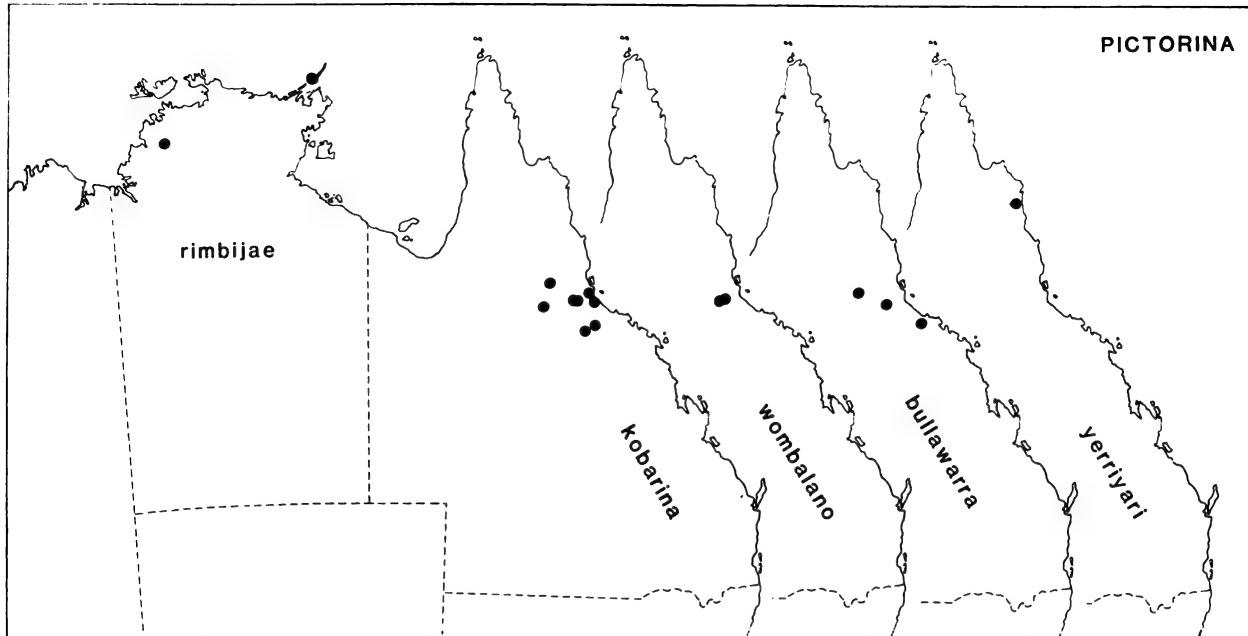
Pictorina kobarina n. sp., Figs. 99, 102CEH

RANGE. Mountains west of Townsville, QLD.

RECOGNITION. Males: Almost indistinguishable from *P. bullawarra* but differing markedly in song. Top of head reddish. Top of pronotum as in *P. bullawarra*. Genitalia as in Fig. 102C. FW about 2.6 times as long as pronotum. FW venation as in Fig. 102H. File with 119–142 teeth (n=5). Tibia III with 5 outer and 4 inner subapical spurs. Holotype measurements: Femur III 1.55 times as long as tibia III. Tibia III 1.94 times as long as basitarsus III. Body length 14.0 mm, FW 6.3 mm, femur III 9.0 mm, tibia III 6.0 mm, cerci 9.0 mm.

Females: Coloration generally similar to males. Dorsum of thorax and abdomen dark reddish-brown and spotted with black. FW's very small, just barely protruding beyond pronotum. Head and pronotum equal in width. Ovipositor about 0.9 times as long as femur III. Body length about 17.0 mm, femur III about 10.5 mm, tibia III ca. 7 mm, cerci ca. 10 mm, ovipositor ca. 10 mm.

VARIATION. A male from A-493 has 119 teeth. A male from A-486 has 139 teeth. A male from A-480 has 133 teeth. A male from Mingela, QLD, has 128 teeth.

FIG. 100. *Pictorina* distributions.

HOLOTYPE. ♂, A-269, Running River, west of Paluma and Mt. Spec, QLD, 23 x 1968, ANC.

SONG. Fig. 101. Succession of trills about 2 seconds in duration at 3–4 trills per minute at type locality.

	p/s	kps	°C
A-269 n=2	20.1, 26.7	4.6, 6.4	21
A-493	28.5	4.9	27

HABITAT. Sings from ground in dry eucalypt woodland.

SPECIMENS. Holotype ♂ ANC. A-480 1♂ ANSP. A-486 1♂ ANC. A-493 1♂ UM, 1♀ ANC. QUEENSLAND: Mingela, 18 i 1964 (Sedlacek) 2♂ BISH. 24 km E Charters Towers, 18 i 1964 (Sedlacek) 1♂ BISH.

LISTENING RECORDS. A-19, A-271, A-272, A-283.

Pictorina yerriyari n. sp., Fig 102BKO

RANGE. Type locality south of Cooktown, QLD.

RECOGNITION. Males: Very similar to *P. kobarina* and *P. bullawarra* but differing in song. Front of pronotum wider than rear. Side of thorax as in Fig. 102O. Genitalia as in Fig. 102B. FW as in Fig. 102K. File 2.0 mm and with 122 teeth (n=1). Head 0.91 times as wide as pronotum. Front of pronotum

1.12 times as wide as rear, and 1.81 times as wide as pronotal length. FW 2.38 times as long as pronotum. Femur III 1.52 times as long as tibia III. Tibia III 2.06 times as long as basitarsus. III Body length 15.0 mm, FW 6.2 mm, femur III 9.8 mm, tibia III 6.0 mm, cerci ca. 8.0 mm.

HOLOTYPE. ♂, A-37, near Mt. Tolbert, 18 road miles from Wyalla Plains on road to Cooktown, near Bloomfield, QLD, 6 viii 1968, ANC.

SONG. Fig. 101. Succession of short trills roughly at 7 trills/10 s. Each trill has accelerating pulse rate and increases in intensity. Trills contain mode of 24 pulses and have duration of ca. 0.75 seconds at 19°C.

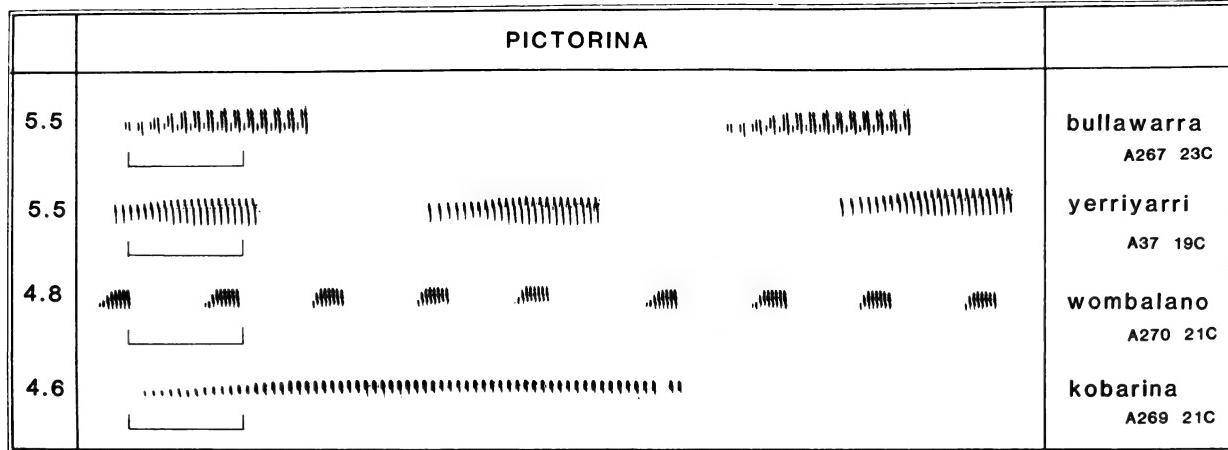
	p/s	tr/s	p/tr	kps	°C
A-37	32.0	1.25	ca. 24	5.2	19

HABITAT. Found singing in leaf litter in eucalyptus forest.

SPECIMENS. Holotype ♂ ANC.

Pictorina wombalano n. sp., Fig. 102JN

RANGE. Known only from near Mt. Spec, northern QLD.

FIG. 101. *Pictorina* songs. Scale = 0.5 s.

RECOGNITION. Males: Very similar to *P. bullawarra*. Genitalia very similar to *P. kobarina* and *P. yerriyari*. Top of head black; face and side of head reddish. Side of pronotum as in Fig. 102N. FW venation similar to *P. bullawarra*. File with 90–99 teeth ($n=4$). Head as wide as pronotum. Front of pronotum slightly wider than back and about 1.7 times pronotal length. FW about 2.6 times as long as pronotum. Holotype measurements: Femur III 1.68 times as long as tibia III. Tibia III 1.92 times as long as basitarsus III. Body length 13.0 mm, FW 5.2 mm, femur III 7.7 mm, tibia III 5.0 mm, cerci 8.8 mm.

HOLOTYPE. ♂, A-270, 2.2 miles east of Running River, near Paluma, QLD, 23 x 1968, ANC.

SONG. Fig. 101. Succession of short, rapid-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-270	55	2.15	8–9	4.8	21

HABITAT. In grasses in open eucalyptus woodland.

SPECIMENS. Holotype ♂ ANC. A-270 2♂ ANC, 1♂ ANSP.

LISTENING RECORDS. A-272.

Pictorina rimbijae n. sp., Fig. 102DL

RANGE. Extreme northern NT.

RECOGNITION. Males: Dorsum of head black. Pronotal disk black but with pale anterior and posterior margins. Face orange. Legs pale brown. Files of two paratypes with 90 teeth (Rimbija Isl) and 117

teeth (S of Darwin). Male genitalia as in Fig. 102D. Holotype measurements: FW 2.6 times as long as pronotum. Femur III 1.46 times as long as tibia III and 1.66 times as long as FW. Tibia III with 5 inner and 5 outer subapical spurs. Body length ca. 12 mm; femur III ca. 8 mm.

HOLOTYPE. ♂, 11.01S 136.45E, Rimbija Island, Wessel Islands, NT, 8 ii 1977 (Weir) ANC.

SONG. Not known.

HABITAT. Probably savanna woodland, at least south of Darwin.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 2♂ ANC. 136–168 km S Darwin, 11 i 1964 (Sedlacek) 1♂ ANC.

RUFOCEPHALUS n. gen.

TYPE SPECIES. *Rufocephalus chindrinus* n. sp.

This genus is restricted to the northern half of WA. Three species occur in the Kimberley region and one ranges through the Hamersley district. All occur in dry red soils and rocky habitats.

RECOGNITION. May be distinguished from other groups on the basis of following combination of characteristics: Mirror complete and undivided. Mirror attached to Cu₁ through long connecting vein (Fig. 106H–L). Veins 2A and 3A connected by two veins in basal area. Epiphallus cup-shaped and without central lobe (except in *R. garooris*, Fig. 106ABC).

chindrinus

1. File with 50 teeth.
2. File with ca. 20 teeth/mm near center.

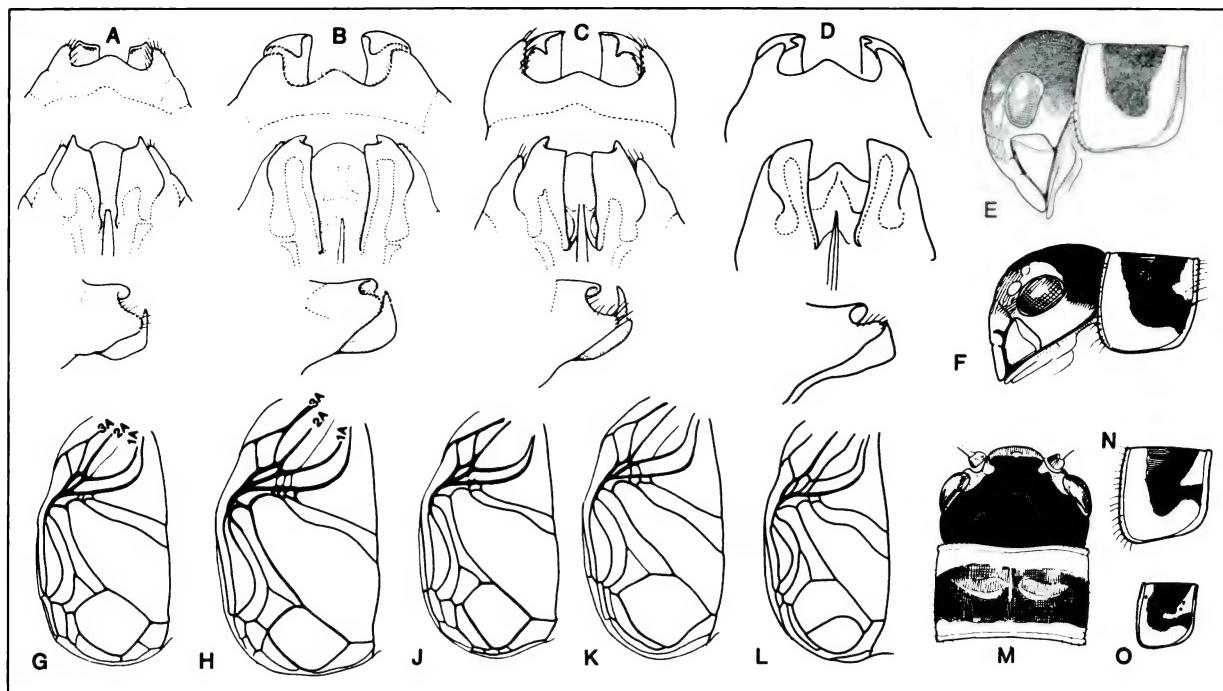


FIG. 102. *Pictorina*, Bullawarra Group. A, *bullawarra*; B, *yerriyari*; C, *kobarina*; D, *rimbijae*; E, *kobarina*; F, *bullawarra*; G, *bullawarra* holotype; H, *kobarina* holotype; J, *wombalano* holotype; K, *yerriyari* holotype; L, *rimbijae* holotype; M, *bullawarra*; N, *wombalano*; O, *yerriyari*.

3. Pronotal width/pronotal length less than 1.65.
4. FW length/pronotal length less than 3.0.
5. Genitalia similar to Fig. 106B.

mirretis

1. File with 82–88 teeth.
2. File with 32–35 teeth/mm near center.
3. Pronotal width/pronotal length less than 1.65.
4. FW length/pronotal length less than 3.0.
5. Genitalia as in Fig. 106A.

milyaroois

1. File with ca. 57 teeth.
2. File with 21–23 teeth/mm near center.
3. Pronotal width/pronotal length more than 1.75.
4. FW length/pronotal length more than 3.0.
5. Genitalia as in Fig. 106B.

garooris

1. File with 92–103 teeth.
2. File with ca. 33 teeth/mm near center.
3. Pronotal width/pronotal length more than 1.75.
4. FW length/pronotal length more than 3.0.
5. Genitalia as in Fig. 106C.

Rufoccephalus chindrinus n. sp., Fig. 106FH

RANGE. Kimberley district to southwest of Broome.

RECOGNITION. Males: Dorsum and side of head

reddish, dorsum of pronotum with pale bands along front and hind margins. FW and dorsum of abdomen pale red-brown. Face reddish down to bottom margin of clypeus, then pale. Head not flattened as in *A. ilari*. Lateral lobes pale below, brown above (Fig. 106F). Head width slightly wider than pronotum. Front of pronotum as wide as rear. Pronotal width about 1.6 times pronotal length. FW about 2.9 times as long as pronotum. FW venation as in Fig. 106H. Mirror undivided; connected to Cu₁ vein by longish vein. File with 50 teeth. Femur III with irregular reddish marking on upper half of inner face in distal half. Tibia III with 6 outer and 4 inner subapical spurs. Basitarsus III with 8 outer and 7 inner spines. Femur III 1.54 times as long as tibia III. Tibia III 2.08 times as long as basitarsus III. Top of abdomen light reddish-brown, lateral portions of tergites pale. Genitalia similar to *R. milyaroois*. Body length 12.5 mm, FW 6.0 mm, femur III 7.0 mm, tibia III 4.5 mm, cerci ca. 8.5 mm.

HOLOTYPE. ♂, A-755, 302 miles northeast of Port Hedland on road to Broome, WA, 13 v 1969, ANC.

SONG. Fig. 105. Succession relatively widely spaced 3-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-755 n=2	57, 60	3	3	3.6	20
A-783 n=2	66	1.3	3	5.1, 5.2	26

HABITAT. Open, short eucalyptus woodland.

SPECIMENS. Holotype ♂ ANC.

LISTENING RECORDS. A-758, A-759.

Rufocephalus garooris n. sp., Figs. 103, 106CDL

RANGE. Hamersley Range and Ashburton River basin, WA.

RECOGNITION. Males: Head reddish and darker than somewhat more yellowish pronotum. Head somewhat flattened front to back; vertex distinctly higher than pronotum (side view). Clypeus angulate, not broadly rounded. Side of head about as dark as top. Disk of pronotum somewhat paler along front and back margins. Lateral lobes somewhat darker above, without clearly defined dorsal dark band. Head about 1.2 times as wide as pronotum. Front of pronotum slightly wider than rear. Pronotum width about 1.9 times pronotal length. FW about 3.2 times as long as pronotum. FW venation as in Fig. 106L. Lateral field of FW dark in dorsal half. File with 92–103 teeth (n=5). Top of abdomen uniformly reddish-brown, but pale between the cerci. Tibia III with 6 outer and 4 inner subapical spurs. Genitalia as in Fig. 106C. Holotype measurements: Body length 14.2 mm, FW 6.3 mm, femur III 7.6 mm, tibia III distorted; cerci broken. File with 101 teeth.

VARIATION. In a second male from the type locality the upper side of the lateral lobe has a broad dark band. A male from A-901 has 100 teeth, and the lateral lobe lacks a strong dark band in the upper half and the mirror is divided by a single vein which runs from near the origin of the diagonal vein to the posterior lateral vein and tibia III has 3 inner and 5 outer subapical spurs. A male from A-713 has 92 teeth and the mirror is divided into 6 or 7 cells. A male from Narrina Pool, WA, has 103 teeth.

HOLOTYPE. ♂, A-884, 1 mile east of Marble Bar, WA, 20 v 1969, ANC.

SONG. Fig. 105. Chirps containing 5–13 pulses and rather slow chirp rate.

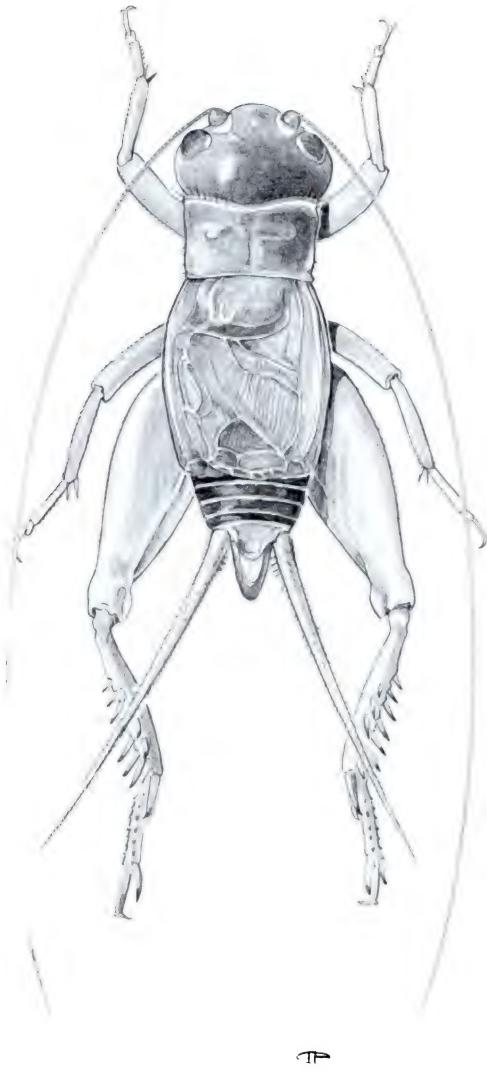


FIG. 103. *Rufocephalus garooris*.

	p/s	ch/s	p/ch	kps	°C
A-901	29	—	11	3.6	19
A-884 n=2	52–55	—	9–13	4.9–6.0	27
A-894	33	2.63	5–7	3.5	23

HABITAT. Open plains and hills; found singing under stones.

SPECIMENS. Holotype ♂ ANC. A-713 1♂ ANC. A-884 1♂ UM. A-901 1♂ ANSP. WESTERN AUSTRALIA: Narrina Pool, Chichester Range, 11 vii 1975 (Bailey) 2♂ ANC. 20 km SW Marillana, E Hamersley, 28 viii 1978 (Bailey) 1♂ ANC.

LISTENING RECORDS. A-891, A-892, A-893.

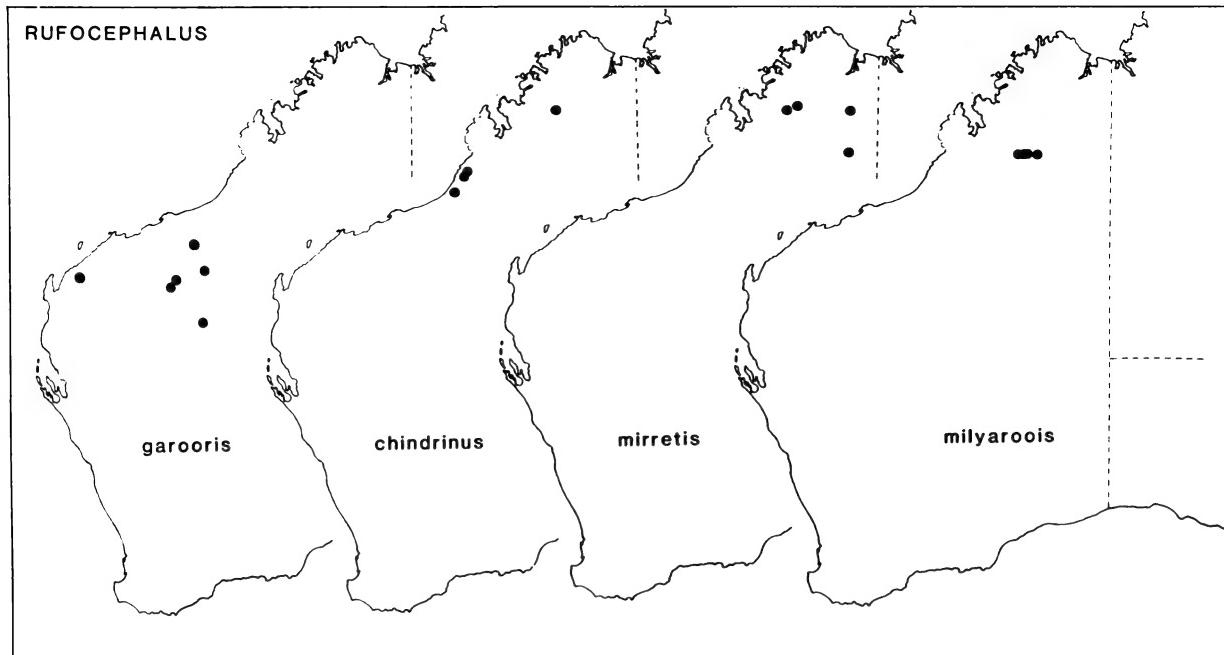


FIG. 104. *Rufocephalus* distributions.

Rufocephalus milyaroois n. sp., Fig. 106BJ

RANGE. Kimberley district, WA.

RECOGNITION. Males: Very similar to *R. chindrinus* in almost all respects, but with different song. Disk of pronotum lighter than head and with pale bands along both front and back margins. Lateral lobes somewhat as in *R. chindrinus*, but darker area

not as clearly defined. Head slightly wider than pronotum. Pronotum with parallel sides. Pronotal width about 1.8 times pronotal length. FW about 3.2 times as long as pronotum. File with 50–57 teeth ($n=3$). Genitalia as in Fig. 106B. Holotype measurements: Femur III 1.6 times as long as tibia III. Tibia III 1.92 times as long as basitarsus III. Body

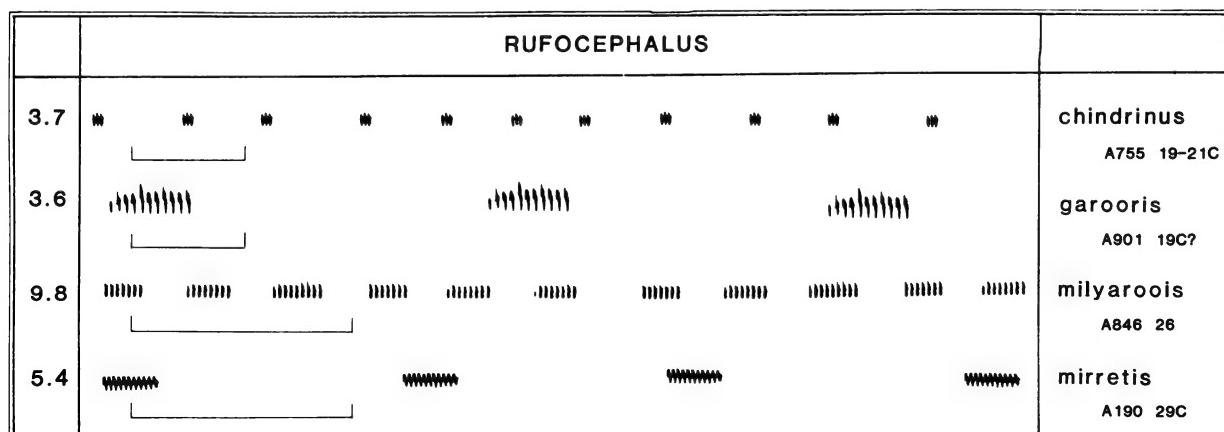


FIG. 105. *Rufocephalus* songs. Scale = 0.5 s.

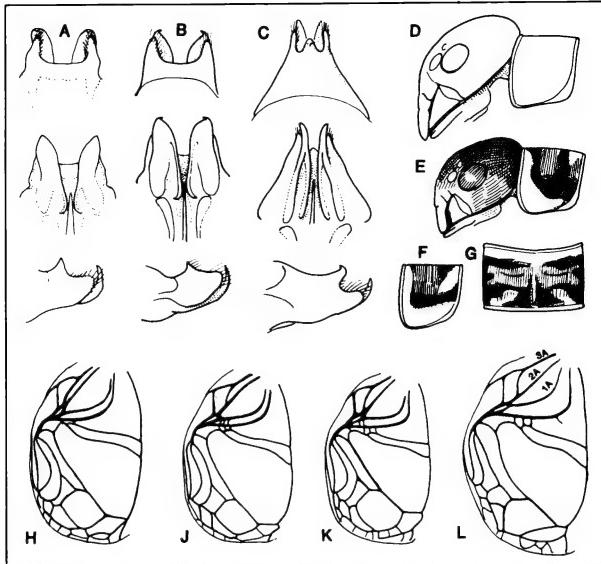


FIG. 106. *Rufocephalus*. A, *mirretis*; B, *milyaroois*; C, *garrooris*; D, *garrooris*; E, *mirretis*; F, *chindrinus* lateral lobe; G, *mirretis* pronotal disk; H, *chindrinus* A-755; J, *milyaroois* holotype; K, *mirretis* holotype; L, *garrooris*.

length 11.5 mm, FW length 5.5 mm, femur III 6.6 mm, tibia III 4.3 mm, cerci broken, more than 7 mm.

HOLOTYPE. ♂, A-849, 30 miles west of Lower Fitzroy River, WA, 18 v 1969, ANC.

SONG. Fig. 105. Succession of 8 to 9-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-846	80	5.1	8-9	9.8	26

HABITAT. Grasslands with scattered trees.

SPECIMENS. Holotype ♂ ANC. A-848 1♂ ANSP. A-850 1♂ ANC. LISTENING RECORDS. A-851, A-852, A-853, A-854.

Rufocephalus mirretis n. sp., Fig. 106AEGK

RANGE. Kimberley region, WA.

RECOGNITION. Males: Top of head deep reddish-brown. Disk of pronotum mottled and with pale band across front (Fig. 106G). Head slightly wider than pronotum. Pronotum about 1.6 times as wide as long. FW about 2.6 times as long as pronotum. File with 82-88 teeth (n=2). Genitalia as in Fig. 106A. FW venation as in Fig. 106K. Holotype measurements: Femur III 1.64 times as long as tibia III. Tibia III 2.05 times as long as basitarsus III. Body

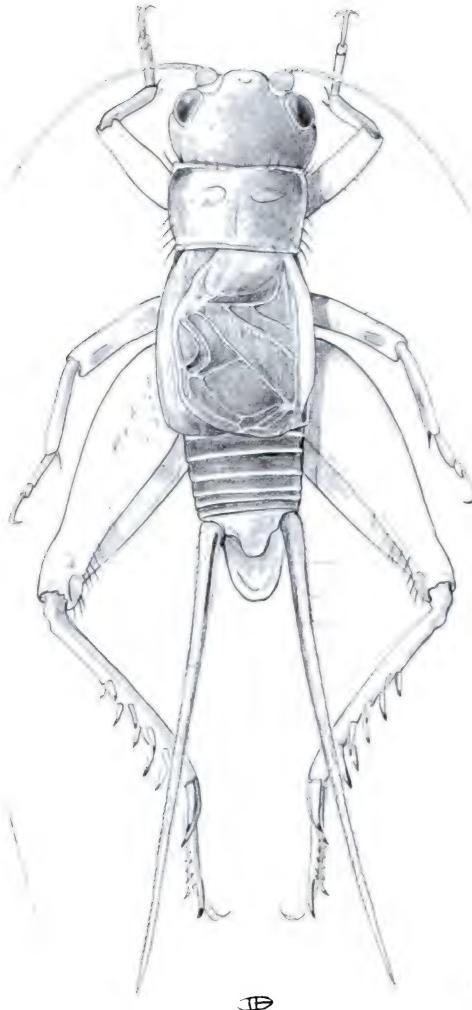


FIG. 107. *Apedina thurgonalae*.

length 12.3 mm, FW 5.2 mm, femur III 7.0 mm, tibia III 4.2 mm, cerci 7.3 mm.

HOLOTYPE. ♂, A-190, 7 miles southeast of Halls Creek, WA, 2 x 1968, ANC.

SONG. Fig. 105. Succession of 11-14 pulse chirps with rapid pulse rate.

	p/s	ch/s	p/ch	kps	°C
A-190 n=5	85-90	1.4-1.5	11-14	5.3-5.5	30

HABITAT. Open grasslands.

SPECIMENS. Holotype ♂ ANC. A-186 1♂ ANC. A-783 1♂ ANC. A-788 1♂ ANSP.

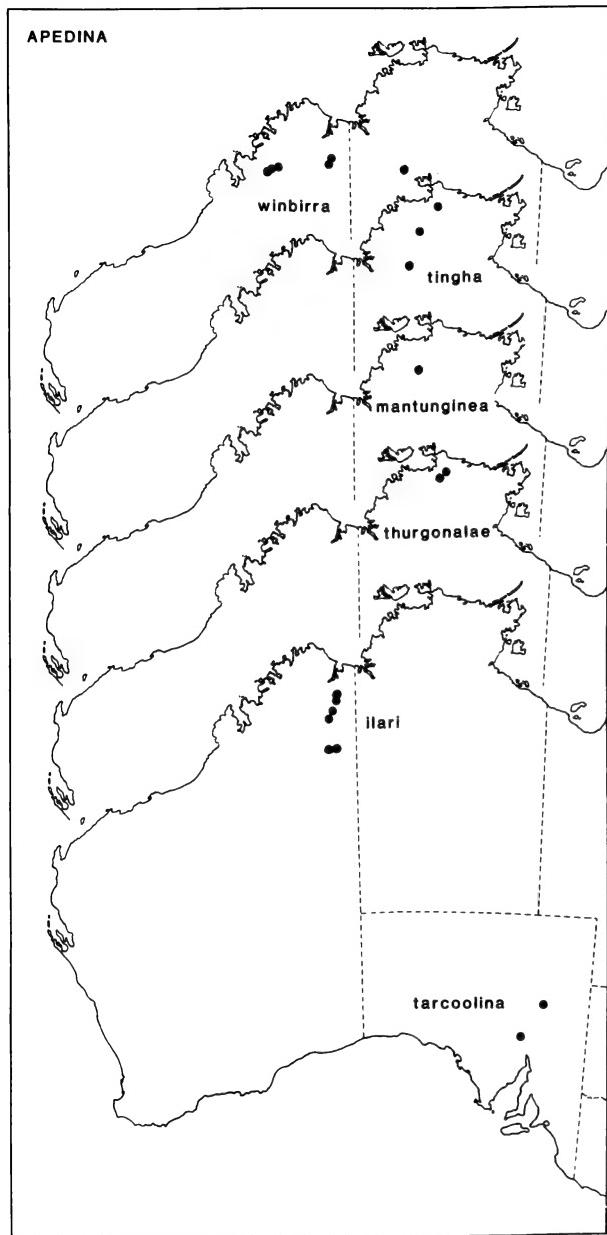


FIG. 108. *Apedina* distributions.

APEDINA n. gen.

TYPE SPECIES. *Apedina ilari* n. sp.

This genus includes six species, all new, from northern Australia, where they are normally associated with rock crevices and cracks in soil banks.

RECOGNITION. Members possess following combination of characteristics: Body flat. Face (front view) low and very wide (Fig. 110PQTUV). Mirror complete and undivided. Mirror attached to Cu₁ indirectly by connecting vein (Fig. 110G–M). Veins 3A and 2A connected by one vein in basal area. Posterior margin of FW obliquely truncated (except in *A. tarcoolina*). Greatest distance between chords 1A and 2A distinctly greater than greatest distance between chords 1A and Cu₂. Harp veins rather straight. Females without FW's or HW's (based on *A. thurgonalae*).

The genus is composed of three subgroups. One group consists of *A. ilari* and *A. winbirris* in which the epiphallus is almost cup-shaped. Another group consists of *A. thurgonalae*, *A. tingha* and *A. mantunginea* which also possess distinctive genitalia (Fig. 102ABC). A third group is comprised of a single species, *A. tarcoolina*, in which the epiphallus has a large median lobe (Fig. 102F) and in which the clypeus extends onto the dorsum of the head (Fig. 102V).

ilari

1. Cerci with only an inner dark streak.
2. File with 111–113 teeth.
3. FW length/pronotal length more than 3.0.
4. Tibia III with 5 inner and 5 outer subapical spurs.
5. Head width/pronotal width equal to or greater than 1.1.
6. Femur III length less than 8 mm.

winbirris

1. Cerci with both inner and outer dark streaks.
2. File with 189–233 teeth.
3. FW length/pronotal length less than 2.5 more than 2.0.
4. Tibia III with 5 inner and 4 outer subapical spurs.
5. Head width/pronotal width equal to or greater than 1.1.
6. Femur III length more than 8 mm.

tarcoolina

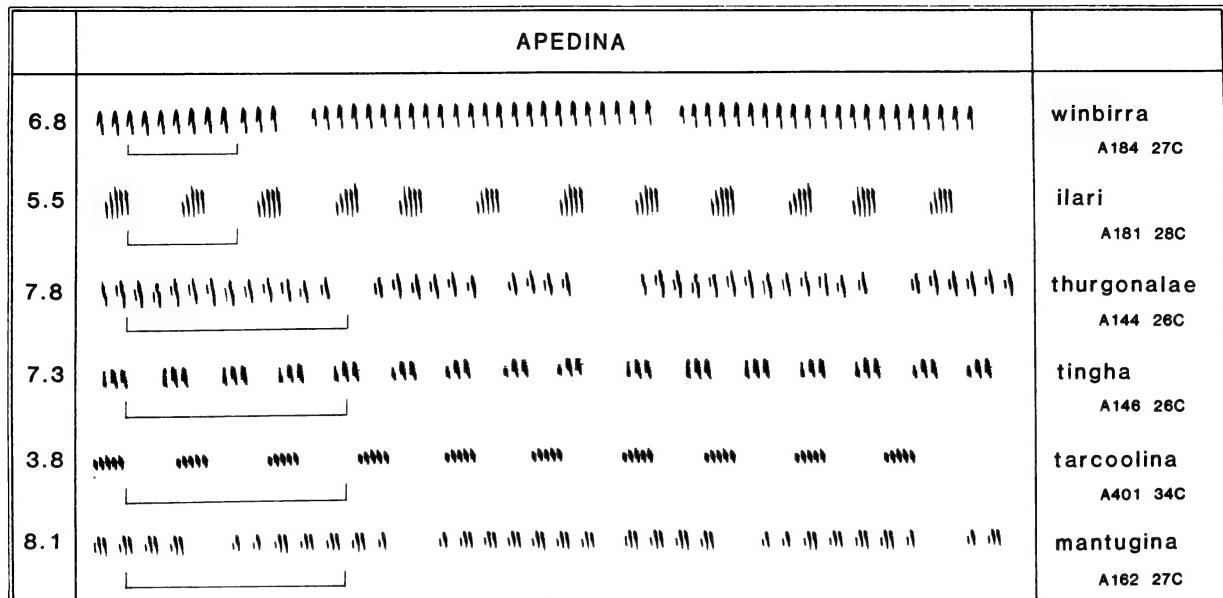
1. Cerci without dark streaks.
2. File with 66–73 teeth.
3. FW length/pronotal length more than 3.0 mm.
4. Tibia III with 5 inner and 3 outer subapical spurs.
5. Head width/pronotal width equal to or greater than 1.1.
6. Femur III length less than 8 mm.

thurgonalae

1. Cerci with both inner and outer dark streaks.
2. File with 121 teeth.
3. FW length/pronotal length less than 2.0.
4. Tibia III with 5 inner and 4 outer subapical spurs.
5. Head width/pronotal width 1.0 or less.
6. Femur III length more than 10 mm.

tingha

1. Cerci with only an inner dark streak.
2. File with 121–131 teeth.
3. FW length/pronotal length more than 2.0 but less than 2.5.

FIG. 109. *Apedina* songs. Scale = 0.5 s.

4. Tibia III with 5 inner and 4 outer subapical spurs.
5. Head width/pronotal width 1.0 or less.
6. Femur III length less than 8.0 mm.

mantuginea

1. Cerci with only an inner dark streak.
2. File with 118–126 teeth.
3. FW length/pronotal length more than 2.0 and less than 2.5.
4. Tibia III with 5 inner and 4 outer subapical spurs.
5. Head width/pronotal width 1.0 or less.
6. Femur III length more than 8.0 mm.

***Apedina ilari* n. sp., Fig. 110DOP**

RANGE. Kimberley region, WA.

RECOGNITION. Males: Body very flat (Fig. 110P), but clypeus not as in *A. tarcoolina*. In view from above, top of clypeus anterior to front of antennal sockets. Dorsum of head uniformly reddish. Pronotal disk with pale band along front margin; pale band about 0.25 times pronotal length in width. Posterior $\frac{3}{4}$ of disk orange. Lateral lobes with pale band along bottom and front and with brown band along top which does not reach front margin (Fig. 102N). Head width about 1.2 times greatest pronotal width. Front of pronotum about 1.15 times as wide as rear. Greatest pronotal width about 2.0 times pronotal length. FW about 3.1 times as long as pronotum. FW venation as in Fig. 102K. Mirror complete and undivided and pointed laterally. File with 97–113 teeth ($n=4$). Lateral field pale in bot-

tom $\frac{2}{3}$ and brown in top $\frac{1}{3}$. Dorsum of abdomen transversely banded with reddish-brown and pale tan. Legs pale with dark setae. Cerci with dark line along inner face. Femur III with brown line in groove on external surface in third quarter. Inner face of femur III with two longitudinal brown bands, one above internal ridge and wider one below it. Tibia III with 5 inner and 5 outer subapical spurs. Basitarsus III with 7 outer and 6 inner spines. Genitalia as in Fig. 110D. Holotype measurements: Femur III 1.50 times as long as tibia III. Tibia III 2.08 times as long as basitarsus III. Body length 14 mm; FW 5 mm; femur III 7.3 mm; tibia III 5 mm; cerci more than 8 mm. File with 111 teeth.

HOLOTYPE. ♂, A-181, 43.6 miles southeast of Wyndham, and 4.8 miles south of junction of roads to Wyndham, Halls Creek, and Kununurra, WA, 2 x 1968, ANC.

SONG. Fig. 109. Succession of 5-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-181 n=4	43–46	2.8–3.0	5	5.7–6.0	28
A-190 n=3	47–50	3.1–3.6	5–6	5.3–6.4	30

HABITAT. Soil cracks in open grassy plains.

SPECIMENS. Holotype ♂ ANC. A-181 1♂ ANSP. A-190 1♂ ANC. A-192 1♂ UM.

LISTENING RECORDS. A-183, A-185, A-188, A-191, A-192.

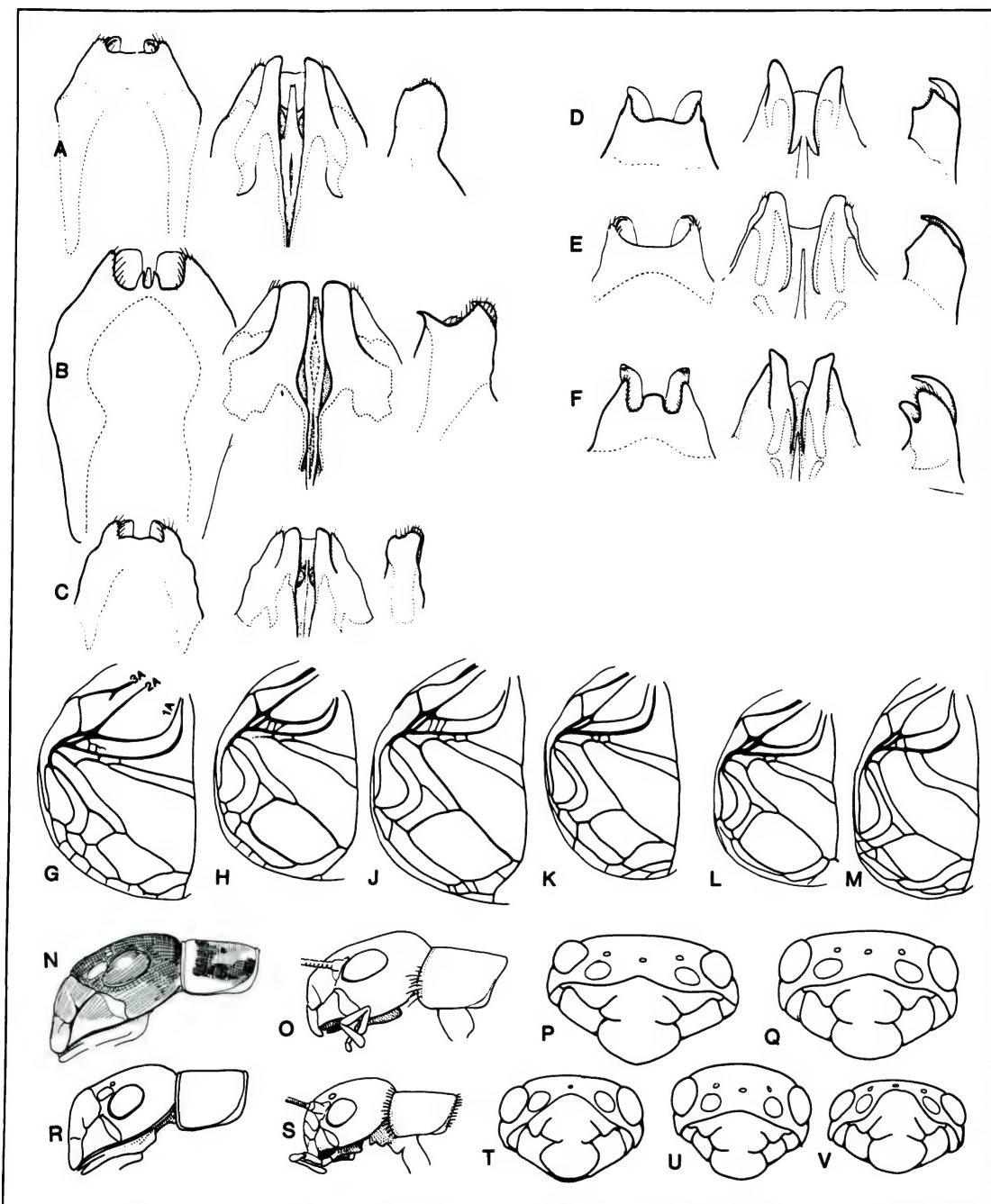


FIG. 110. *Apedina*. A, *mantunginea* A-162; B, *thurgonalae* A-144; C, *tingha*, A-162; D, *ilari* A-190; E, *winbirris* holotype; F, *tarcoolina* A-401; G, *winbirris* holotype; H, *mantunginea*; J, *thurgonalae*; K, *ilari* A-181; L, *tingha*; M, *tarcoolina*; N, *ilari* A-181; O, *ilari* A-192; P, *ilari* and *winbirris*; Q, *mantunginea* and *thurgonalae*; R, *tarcoolina*; S, *tingha*; T, *tarcoolina*; U, *tingha*; V, *tarcoolina*.

***Apedina winbirris* n. sp., Fig. 110EGP**

RANGE. Kimberley region, WA.

RECOGNITION. Males: Very similar to *A. ilari*. Top of head uniformly reddish, very slightly darker than pronotal disk. Side of head as dark as dorsum. Disk of pronotum almost uniformly reddish. Lateral lobes mostly darker than disk, but lower front corner pale. Head width about 1.1 times greatest pronotal width. Front of pronotum as wide as rear. Greatest pronotal width about 1.6 times pronotal length. FW about 2.2 times as long as pronotum. FW rather dark brown in mirror and apical areas. Mirror pointed laterally. File with 189, 233 teeth ($n=2$). Abdomen gray-brown and somewhat grainy in appearance and with transverse rows of small pale spots on sides of each tergite except last 3. Cerci with conspicuous gray-brown pigmentation on both inner and outer faces. Legs pale. Femur III with dark streak on external surface. Tibia III with 4 inner and 5 outer subapical spurs. Basitarsus III with 7 inner and 7 outer spines. Genitalia as in Fig. 110E. Holotype measurements: Femur III 1.37 times as long as tibia III. Tibia III 2.33 times as long as basitarsus III. Body length 14.5 mm; FW 5.6 mm; femur III 9.2 mm; tibia III 6.6 mm; cerci broken. File with 233 teeth.

HOLOTYPE. ♂, A-184, 43 miles south of the junction to Wyndham, Halls Creek, and Kununurra, WA, 2 x 1968, ANC.

SONG. Fig. 109. Trill with rather slow pulse rate which is broken irregularly and momentarily every few seconds.

	p/s	kps	°C
A-184	14.3–15.2	6.8	27
A-785	11.4	6.6	26

HABITAT. Soil cracks and rock crevices in open country. Male in Kimberley Mts. was singing 10 feet up on cliff face along road.

SPECIMENS. Holotype ♂ ANC. A-788 2♂ ANC. A-792 1♂ ANSP.
LISTENING RECORDS. A-184, A-214, A-788.

***Apedina thurgonaleae* n. sp., Figs. 107, 110BJQ**

RANGE. Extreme northern NT.

RECOGNITION. Males: Body flat, rather similar to *A. ilari* in shape (Fig. 110P). Head and pronotum uniformly rusty red. Side of head as dark as top.

Disk of pronotum without pale transverse bands. Lateral lobes uniformly rusty red; without pale ventral band (unlike above two species) Head width 0.96 times greatest pronotal width. Front pronotal width about 1.13 times rear width. Greatest pronotal width about 1.6 times pronotal length. FW about 1.8 times as long as pronotum. FW venation as in Fig. 110J. FW darker brown in apical, chordal and basal areas. Transparent stripe running along chord Cu₂ and between Cu₂ and 1A. File with 121 (holotype) and 144 teeth. Top of abdomen reddish-brown with prominent transverse pale stripes towards end of abdomen. Cerci rather strongly pigmented on inner and especially on outer faces. Femora I and II with brown marks on inner and outer faces at both proximal and distal ends. Tibiae I and II darker on lower surface than on upper surface. Femur III with series of elongate reddish spots arranged in oblique rows on top outer face; inner face with granular pigmentation above and below the longitudinal ridge. Tibia III pale in upper half, dark reddish in lower half; with 5 outer and 4 inner subapical reddish-brown spurs. Basitarsus III with 7 outer and 6 inner spines. Genitalia as in Fig. 110B. Holotype measurements: Femur III 1.34 times as long as tibia III. Tibia III 2.32 times as long as basitarsus III. Genitalia as in Fig. 110BJQ. Body length 18 mm, FW 6.0 mm, femur III 11.7 mm, tibia III 8.3 mm, cerci broken.

Females: Without FW's or HW's. Body length ca. 16 mm; femur III length 11–12 mm; cercal length at least 12 mm (broken); ovipositor length 14–15 mm.

HOLOTYPE. ♂, A-144, East Alligator River near Oenpelli, NT, 28 ix 1968, ANC.

SONG. Fig. 109. Succession of 2-pulse chirps with chirps in groups. First pulse always less intense.

	p/s	ch/s	p/ch	kps	°C
A-144	79	21.2	2	7.8	26

HABITAT. Rock crevices and possibly cracks in ground.

SPECIMENS. Holotype ♂ ANC. A-144 1♂ ANSP, 1♀ ANC.
NORTHERN TERRITORY: 12.26S 132.58E, 1 km S of Cahills Crossing, East Alligator R, 3 xi 1972 (Key et al.) 3♂ ANC.

***Apedina tingha* n. sp., Fig. 110CLSU**

RANGE. Northern NT.

RECOGNITION. Males: Very similar to *A. ilari*, but genitalia more like *A. mantunginea*. Disk of pronotum lighter along front and rear margins. Lateral lobes with distinct dark band covering most of top half except along the front margin; lower part of lobes mostly pale—and with pale band becoming wider anteriorly. Head as wide as pronotum. Pronotum slightly wider at front than at rear. Pronotal width about 1.75 times pronotal length. FW about 2.35 times as long as pronotum. File with 121, 131 teeth ($n=2$). Lateral field of FW mostly dark, but top region between M and R veins pale. FW venation similar to *A. thurgonala*. Dorsum of abdomen with strong transverse bands. Tibia III with 5 outer and 4 inner subapical spurs. Cerci with a dark streak along inner face. Inner face of femur III with 2 elongate dark streaks, one on either side of the central ridge. Male from A-162 has dark streaks on inside of femur III very pronounced, ventral pale region on lateral lobes not extending into posterior half, and file bearing 121 teeth. Holotype measurements: Femur III 1.43 times as long as tibia III. Tibia III 2.07 times as long as basitarsus III. Body length 13 mm, FW 4.5 mm; femur III 7.8 mm, tibia III 5.3 mm, cerci broken.

HOLOTYPE. ♂, A-146, 6 miles west of East Alligator River, NT, 28 ix 1968, ANC.

SONG. Fig. 109. Rapid succession of 3-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-146	50	8.0	3	6.9	26
A-167	48	5.6	3	6.0	30

HABITAT. Soil cracks and rock crevices.

SPECIMENS. Holotype ♂ ANC. A-162 1♂ ANSP.

Apedina mantunginea n. sp., Fig. 110AHQ

RANGE. Type locality in northern NT.

RECOGNITION. Males: Body flat, very similar to *A. thurgonala*, but differing in song and in shape of genitalia. Side of head with pale streak which runs below and next to eye and begins on base of mandible. Face with pale streak running from median ocellus towards clypeus. Lower ¼ of clypeus pale; from this pale area pale spur extends dorsally into top ¼ of clypeus. Lateral lobe somewhat darker along top than bottom, and with small pale area

along lower front margin. Head about as wide as widest part of pronotum. Pronotum with convex sides (dorsal view). Front of pronotum slightly wider than rear. Greatest pronotal width about 1.9 times pronotal length. FW about 2.2 times as long as pronotum. FW darkest in apical area and between chords 1A and 2A. Files with 118 and 126 teeth. Inner faces of cerci with granular dark brown band. Tibiae I, II, and III dark on lower surface. Femur III without distinct rows of spots as in *A. thurgonala*. Tibia III with 5 outer and 4 inner subapical spurs. Holotype measurements: Femur III 1.47 times as long as tibia III. Tibia III 2.43 times as long as basitarsus III. Body length 17.0 mm, FW 5.0 mm, femur III 9.5 mm, tibia III 7.7 mm, cerci 11.0 mm.

HOLOTYPE. ♂, A-162, 5 miles east of Mary River, near Pine Creek, NT, 28 ix 1968, ANC.

SONG. Fig. 109. Groups of 3-pulse chirps. Groups contain 6 to 10 chirps.

	p/s	ch/s	p/ch	kps	°C
A-162	75	18	3	8.1	27

HABITAT. Rock crevices.

SPECIMENS. Holotype ♂ ANC. A-162 1♂ ANSP.

Apedina tarcoolina n. sp., Fig. 110 FMRTV

RANGE. Central SA.

RECOGNITION. Male: Small, flat, pale, and prognathous (Fig. 110R). Dorsum of head yellow-orange. Clypeus visible from directly above. Median ocellus on top of head and located between rear portion of antennal sockets. Disk of pronotum darker along rear, very pale in front. Lateral lobes very pale. Head wider than widest part of pronotum. Front of pronotum slightly wider than rear. Greatest pronotal width about 1.8 times pronotal length. FW about 3.3 times as long as pronotum. Mirror complete and undivided. FW pale brown, venation as in Fig. 110M. File with 66 and 73 teeth ($n=2$). FW veins about same color as membrane. Dorsum of abdomen reddish-brown. Venter of abdomen including subgenital plate, very pale. Legs all pale. Tibia III with 5 outer and 3 inner subapical spurs. Basitarsus III with 6 inner and 7 outer dorsal spines. Femur III with an irregular brown patch on internal surface in distal third. Holotype measurements: Fe-

mur III 1.63 times as long as tibia III. Tibia III 2.22 times as long as basitarsus III. Body length 13 mm, FW 6 mm, femur III 6 mm, tibia III 3.5 mm, cerci 7 mm.

HOLOTYPE. ♂, A-401, 0.5 miles north of Lyndhurst, SA, 12 i 1969, ANC.

SONG. Fig. 109. Succession of 4-pulse chirps at roughly 5 ch/s at 35°C and with rapid pulse rate.

	p/s	ch/s	p/ch	kps	°C
A-401	65	5.0	5	3.75	34

HABITAT. Found singing in soil cracks beginning at dusk in open plains.

SPECIMENS. Holotype ♂ ANC. A-401 1♂ ANC. 31.32S 137.14E, near Lake Eyre South, SA, 18 ix 1978 (Rentz) 1♂ 1♀ ANC.

LISTENING RECORDS. A-403.

TUMPALIA n. gen.

TYPE SPECIES. *Tumpalia kattara* n. sp.

The nine species of this genus are all from the northern half of NT, where they inhabit soil cracks in open country.

RECOGNITION. Body color and especially dorsum of head reddish, as in other members of Aritella Genus Group. Male FW without mirror. Male FW with only one vein connecting veins 2A and 3A in basal area. Harp veins strongly bent (Figs. 114, 115).

The genus is composed of three species groups: the Kattara Group with four species, the Tau Group with two species, and the Yurriyappa Group with three species.

Tau Group

1. FW more than 3 times as long as pronotum.
2. Genitalia as in Fig. 115A-D.
3. FW venation as in Fig. 115HJ.

Kattara Group

1. FW less than 2.2 times as long as pronotum.
2. Genitalia as in Fig. 114A-D.
3. FW venation as in Fig. 114E-H.

Yurriyappa Group

1. FW more than 2.3 times and less than 3.0 times as long as pronotum.
2. Genitalia as in Fig. 116ABC.
3. FW venation as in Fig. 116DEF.

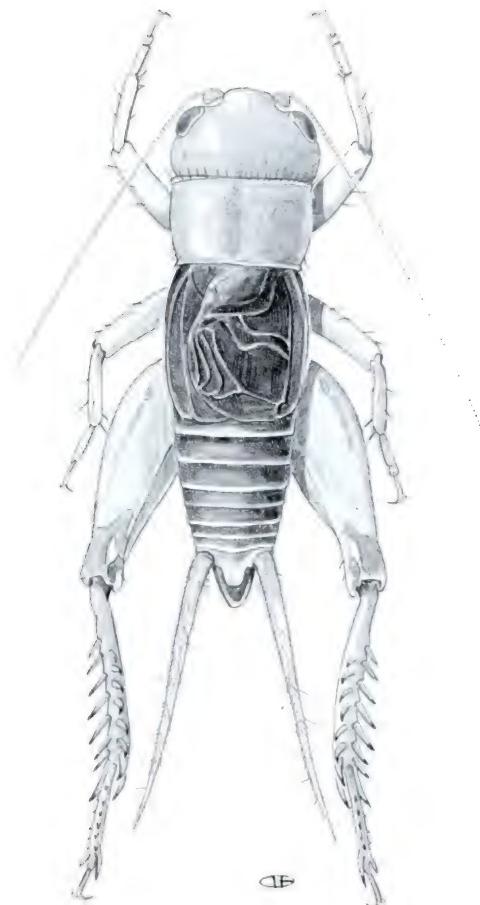


FIG. 111. *Tumpalia kattara*.

KATTARA GROUP

The Kattara Group may be distinguished from other groups by the following combination of characteristics: Epiphallus elongated and possessing a median lobe which is as long or longer than lateral epiphalllic lobes. FW less than 2.2 times as long as pronotum.

kattara

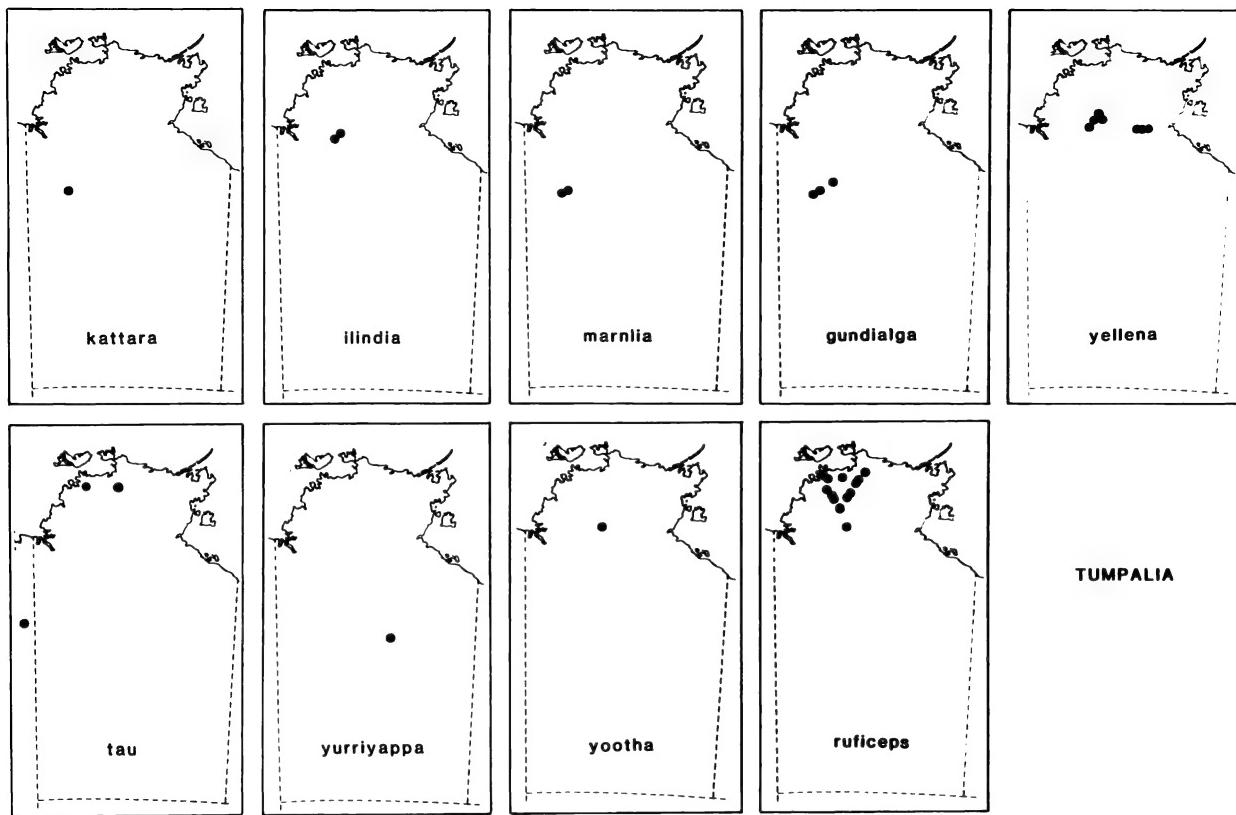
1. File with 123-124 teeth.
2. Genitalia as in Fig. 114D.
3. Tibia III with 5 inner and 6 outer subapical spurs.
4. Femur III more than 9 mm.

marnlia

1. File with 115-122 teeth.
2. Genitalia as in Fig. 114C.
3. Tibia III with 4 inner and 5 outer subapical spurs.
4. Femur III length less than 8 mm.

ilindia

1. File with 90-96 teeth.
2. Genitalia as in Fig. 114A.

FIG. 112. *Tumpalia* distributions.

3. Tibia III with 4 inner and 6 outer subapical spurs.
4. Femur III length less than 8 mm.

gundialga

1. File with 97–112 teeth.
2. Genitalia as in Fig. 114B.
3. Tibia III with 4 inner and 5 outer subapical spurs.
4. Femur III length less than 7 mm.

***Tumpalia kattara* n. sp., Figs. 111, 114DE**

RANGE. Type locality in northwestern NT.

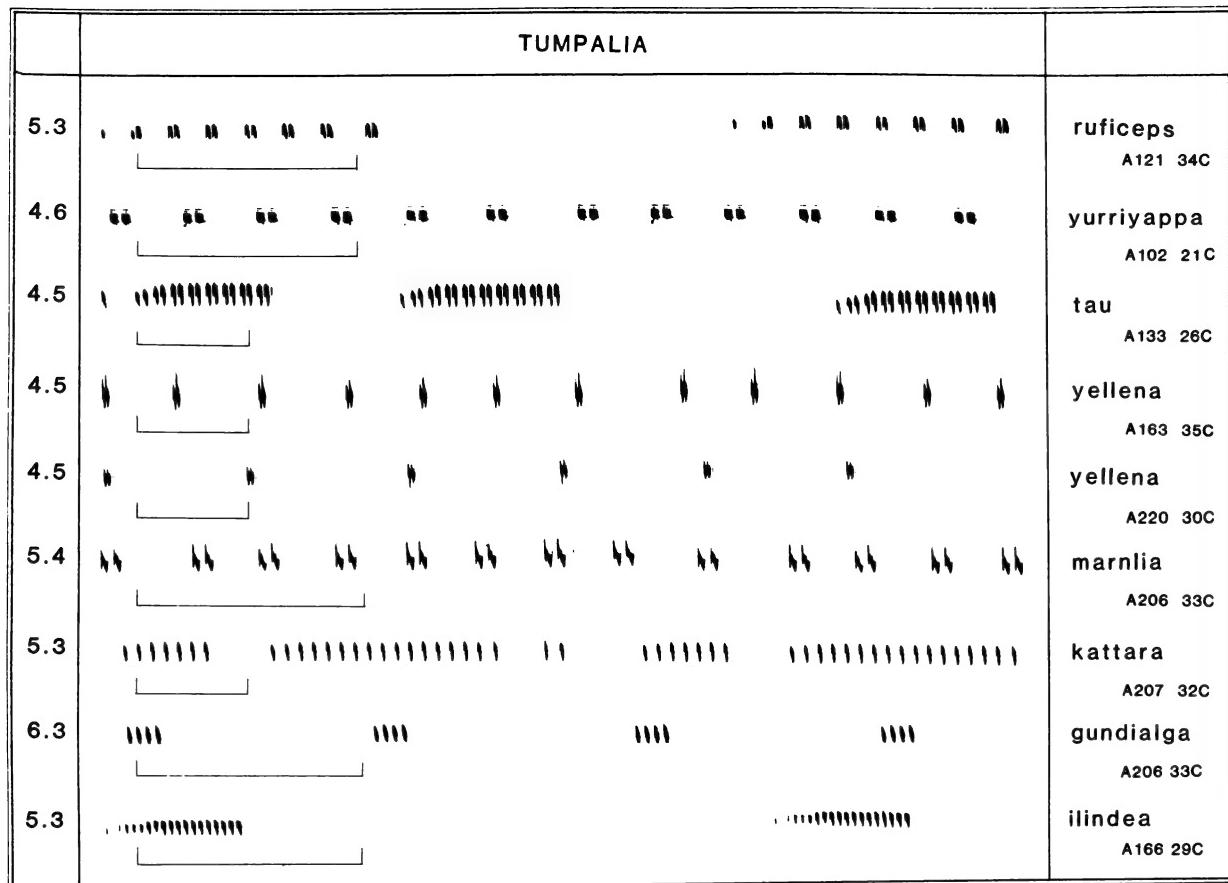
RECOGNITION. Males: Head and pronotum uniformly reddish and about same coloration. Disk of pronotum considerably wider in front than back. Face reddish, pale below middle of clypeus. Side of head yellowish behind eye. Lateral lobes reddish but entire lower front corner pale; sharp transition from red to pale. Mirror absent and apical area with numerous small cells. File with 123, 123, 124 teeth ($n=3$). Head slightly wider than pronotum. Front of pronotum about 1.2 times as wide as rear. Front pronotal width about 1.55 times pronotal length.

FW about 1.8 times as long as pronotum. Top of abdomen roughly same color as pronotum. Femora I and II pale, and with indistinct brown markings on sides. Tibia I and II darker than femora. Tibia III with 6 outer and 5 inner subapical spurs. Holotype measurements: Femur III 1.46 times as long as tibia III. Tibia III 1.88 times as long as basitarsus III. Body length 17 mm, FW 5.0 mm, femur III 10.0 mm, tibia III 6.3 mm, cerci ca. 11 mm.

Females: Colored like male except dorsal thorax and abdomen little darker. FW's tiny, barely extending beyond mesonotum and barely overlapping medially. Head like that of male except epistomal suture less angulate and wholly below antennal sockets. Ovipositor about 3.0 times as long as pronotum. Body length about 17 mm.

HOLOTYPE. ♂, A-207, 17.8 miles northeast of Wave Hill Station, NT, 3 x 1968, ANC.

SONG. Fig. 113. Short trills containing 5–21 pulses. One male sang with 4 second intervals between trills. Second male sang 7 trills in 10 seconds

FIG. 113. *Tumpalia* songs. Scale = 0.5 s.

with number of pulses per trill in one sequence as follows: 15, 8, 5, 8, 11, 7, and 17.

	p/s	p/trill	kps	°C
A-207 n=3	15.5-16.5	5-21	5.1-5.3	33

HABITAT. Open dry stony wash with small trees scattered about.

SPECIMENS. Holotype ♂ ANC. A-207 2♂ 1♀ ANC.

Tumpalia ilindea n. sp., Fig. 114AG

RANGE. Northern NT.

RECOGNITION. Males: Similar to *T. marnlia* but genitalia somewhat different and femora I and II rather densely covered with brownish hairs. Dorsum of head uniformly reddish. Side of head yellowish below and behind eyes. Disk of pronotum somewhat lighter, more orange than head. Lateral

lobes pale in lower front corner and along front margin of disk. Front pronotal width about 1.24 times pronotai length. FW venation similar to *T. kattara*. Files of holotype and paratype with 96 and 90 teeth respectively. Harp with 2 or 3 veins. Dorsum of abdomen about same color as pronotum. Cerci pale, covered with brown hairs. Femora I and II with patches of brown hairs. Top and sides of femur III with rather dense mat of brown hairs. Tibia III with 4 inner and 6 outer subspical spurs. Holotype measurements: Femur III 1.49 times as long as tibia III. Tibia III 2.14 times as long as basitarsus III. Body length 14 mm, FW 4.5 mm, femur III 6.5 mm, tibia III 4.3 mm.

HOLOTYPE. ♂, A-166, 68 miles west of Katherine, NT, 29 ix 1968, ANC.

SONG. Fig. 113. Succession of long chirps with 18 to 20 pulses at roughly 4 chirps per 10 seconds.

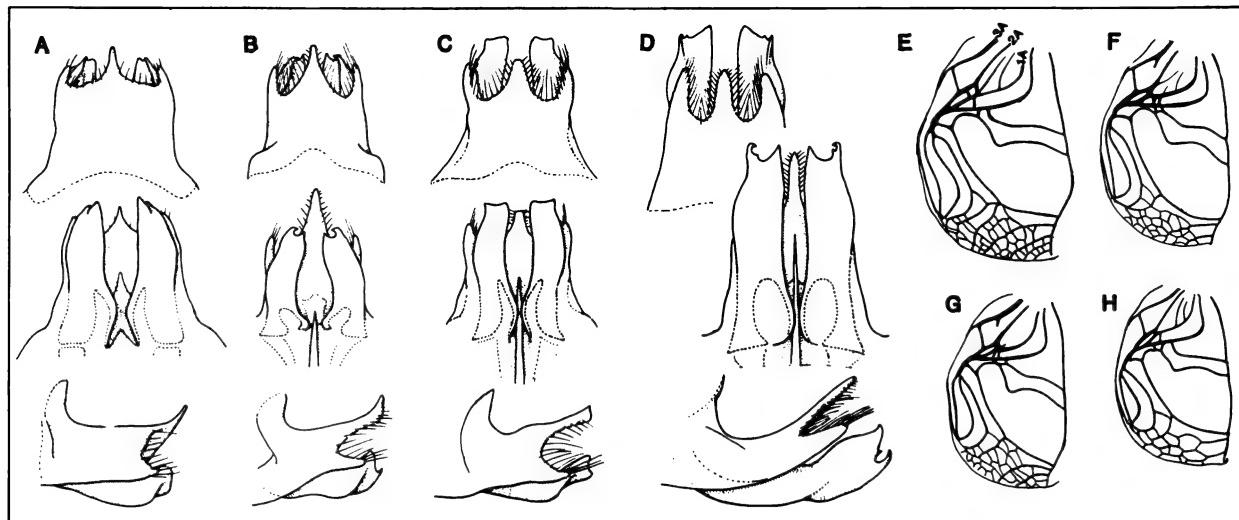


FIG. 114. *Tumpalia*, Kattara Group. A, *ilindea*; B, *gundialga*; C, *marnlia*; D, *kattara*; E, *kattara*; F, *marnlia*; G, *ilindea*; H, *gundialga*.

	p/s	p/ch	ch/s	kps	°C
A-166	57-60	17-19	ca. 0.4	5.3	30

HABITAT. Grasslands with scattered small eucalyptus trees.

SPECIMENS. Holotype ♂ ANC. A-166 1♂ ANSP.

LISTENING RECORDS. A-167.

Tumpalia marnlia n. sp., Fig. 114CF

RANGE. Type locality in northern NT.

RECOGNITION. Males: Similar to *T. kattara* in wing venation and general coloration, but differing as follows: Dorsum of abdomen transversely banded, lighter than disk of pronotum. Lateral lobes of pronotum with dark band along upper side; this band bends upwards towards front. Genitalia as in Fig. 114C. Files of holotype and paratype with 115 and 122 teeth respectively. Head as wide as front of pronotum. Front of pronotum slightly wider than rear. Greatest pronotal width about 1.6 times pronotal length. FW about 2.2 times as long as pronotum. Holotype measurements: Femur III 1.52 times as long as tibia III. Tibia III 2.17 times as long as basitarsus III. Body length 13.77 mm; FW length 5.0 mm; femur III 7.0 mm; tibia III 4.8 mm; cerci 8.0 mm.

HOLOTYPE: ♂, A-206, 3.8 miles north of Wave Hill Station, NT, 3 x 1968, ANC.

SONG. Fig. 113. Succession of 2-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-206	n=2	37, 38	5.6, 6.1	2	5.4
A-207		34	8.0	2	5.3

HABITAT. Soil cracks and crevices in open country.

SPECIMENS. Holotype ♂ ANC. A-206 1♂ ANSP.

Tumpalia gundialga n. sp., Fig. 114BH

RANGE. Northern NT.

RECOGNITION. Males: Similar to *T. ilinda* but smaller and more robust in appearance. Genitalia as in Fig. 114B. FW not as finely celled as in *T. kattara* or *T. marnlia* (Fig. 114H). Dorsum of head and pronotum more orange than red. Legs without dense patches of brown hairs as in *T. ilinda*. File with 97-112 teeth (n=4). Head slightly wider than front of pronotum. Front of pronotum about 1.13 times as wide as rear and about 1.6 times as wide as pronotal length. Holotype measurements: FW 2.05 times as long as pronotum. Femur III 1.60 times as long as tibia III. Tibia III 2.21 times as long as basitarsus III. Body length 12.0 mm; FW length 4.3 mm; femur III 6.3 mm, tibia III 4.2 mm, cerci broken. File with 98 teeth.

Females: Darker than holotype. Dorsum of abdomen and thorax about equal in color. FW's very short but broad pads about $\frac{1}{3}$ as long as pronotum and overlapping medially. Ovipositor about 1.20

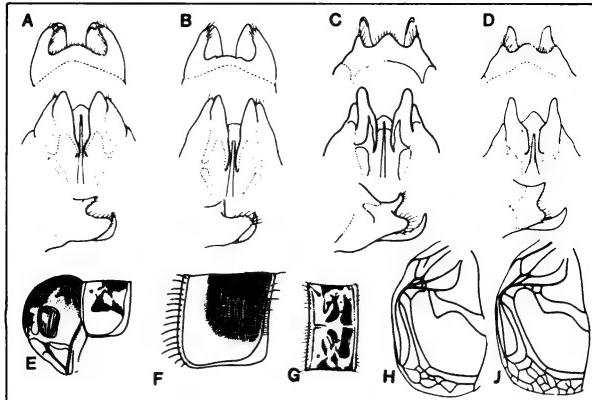


FIG. 115. *Tumpalia*, Tau Group. A, *tau* A-149; B, *tau* A-133; C, D, *yellena*; E, *tau* holotype; F, *yellena* lateral lobe; G, *tau* holotype; H, *tau* holotype; J, *yellena* holotype.

times as long as femur III. Body length ca. 14 mm, femur III 7.0 mm, tibia III 4.8 mm.

HOLOTYPE. ♂, A-206, 3.8 miles north of Wave Hill Station, NT, 3 x 1968, ANC.

SONG. Fig. 113. Succession of 3 or 4 pulse chirps at roughly 2 chirps/s.

	p/s	ch/s	p/ch	kps	°C
A-206	50	1.8	4	6.3	33
A-213	41	2.0	3	6.0	33

HABITAT. Open country.

SPECIMENS. Holotype ♂ ANC. A-208 1♂ ANC. A-213 1♂ 2♀ ANC, 1♂ UM, 1♂ ANSP.

TAU GROUP

This group differs from the Kattara and Yurriyappa groups mainly in the configuration of the male genitalia (Fig. 115). The group possesses the following combination of features which may be used to distinguish it from other groups: Genitalia (top view) with a broad epiphallus and a broad median lobe. FW at least 3 times as long as pronotum. Pronotal width less than 1.75 times its length. Tibia III less than 2 times as long as basitarsus III.

yellena

1. File with 111–128 teeth.
2. File with 55–59 teeth/mm near center.
3. Head more than 1.1 times as wide as pronotum.
4. Apical area of FW with numerous cells (Fig. 115CD).

tau

1. File with 63–70 teeth.

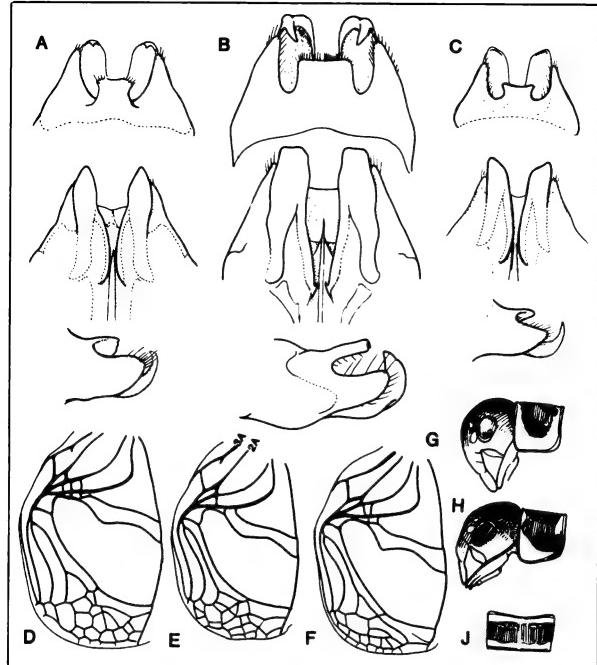


FIG. 116. *Tumpalia*, Yurriyappa Group. A, *yurriyappa*; B, *yootha*; C, *ruficeps*; D, *yurriyappa*; E, *yootha*; F, *ruficeps*; G, *yootha*; H, *yurriyappa*; J, *ruficeps*.

2. File with 26–35 teeth/mm near center.
3. Head less than 1.1 times as wide as pronotum.
4. Apical area of FW with few cells (Fig. 115AB).

Tumpalia tau n. sp., Fig. 115ABEGH

RANGE. Extreme northern NT.

RECOGNITION. Males: Top of head reddish, faintly banded with brownish and pale longitudinal lines. Disk of pronotum mottled (Fig. 115G). FW's extending to 4th quarter of abdomen. Face yellowish from top of antennal sockets to bottom of clypeus. Labrum whitish. Side of head pale, much lighter than top of head, shape of head as in Fig. 115E. Head slightly wider than pronotum. Pronotum about 1.7 times as wide as long. FW about 3.13 times as long as pronotum. File with 111–133 teeth (n=6). Femur III with rows of brown spots on top and top outer faces. Tibia III with 4 outer and 3 inner subapical spurs. All males collected at A-149 have mottled pronotal disks. In male from A-133 pronotum not as mottled and pronotal disk not having pale band along entire front margin. File counts vary as follows: A-149 (111, 114, 120, 122, 128 teeth); 133 (133). Holotype measurements: Femur

III 1.68 times as long as tibia III. Tibia III 1.90 times as long as basitarsus III. Body length 9.5 mm; FW 4.8 mm; femur III 5.9 mm; tibia III 3.7 mm; cerci ca. 6.0 mm.

HOLOTYPE. ♂, A-149, 35 miles west of East Aligator River, NT, 28 ix 1968, ANC.

SONG. Fig. 113. Complex chirps (or short trills), each a rapid sequence of 2-pulse units often preceded by single pulses.

	p/s	ch/s	p/ch	groups/ song	kps	°C
A-133	33	13	2	0.8	4.5	26
A-149	30	16.5	2	0.9	5.2	25

HABITAT. Found at Howard Springs in mud cracks around dry water hole.

SPECIMENS. Holotype ♂ ANC. A-133 1♂ ANSP. A-149 2♂ ANC, 1♂ UM. A-199 1♂ ANC.

Tumpalia yellena n. sp., Fig. 115CDFJ

RANGE. Northern NT.

RECOGNITION. Males: Small, body length about 11 mm. Top of head uniformly reddish. Pronotum relatively small and short and with pale band about $\frac{1}{4}$ length of pronotum in width running across entire front of pronotum. Sides of pronotum (top view) straight and parallel. Body width through FW's much wider than pronotum. Head about 1.16 times as wide as pronotum. Pronotum about 1.7 times as wide as long. FW about 3.2 times as long as pronotum. FW venation as in Fig. 115J. Lateral field of FW slightly darker along upper margin. File with 63–70 teeth (n=6). Dorsum of abdomen red-brown, venter pale. Legs pale; femur III somewhat orange. Tibia III with 5 outer and 4 inner subapical spurs. Basitarsus III with 7 outer and 7 inner spines. Genitalia as in Fig. 115CD. Three males from A-163 very similar to holotype in color. Files bear 64, 66, and 70 teeth. Male from A-219 with dorsum of head and brown portion of pronotal disk very dark reddish-brown; this male has 64 file teeth. Holotype measurements: Femur III 1.65 times as long as tibia III. Tibia III 1.79 times as long as basitarsus III. Body length 11 mm, FW 4.5 mm, femur III 5 mm, tibia III 3.3 mm, cerci 5.3 mm. File with 63 teeth.

HOLOTYPE. ♂, A-217, 24 miles east of Stuart Highway on road to Roper Bar, NT, 4 x 1968, ANC.

SONG. Fig. 113. Series of 2-pulse chirps with relatively fast pulse rate and relatively slow chirp rate.

	p/s	ch/s	p/ch	kps	°C
A-163	69	ca. 3.0	2	4.95	35
A-217 n=3	60–66	2.4–6.3	2	4.4–4.8	32
A-220 n=2	70	1.3–1.6	2	4.3–4.5	30

HABITAT. Found singing at dusk under rocks in dry open area. Later at night also found singing under sparse grass.

SPECIMENS. Holotype ♂ ANC. A-163 3♂ ANC. A-217 1♂ UM. A-219 1♂ ANC. Tindal, 8 mi ESE Katherine, NT, 1♂ ANC, 1♂ ANSP.

LISTENING RECORDS. A-164, A-165.

YURRIYAPPA GROUP

Most similar to the Kattara and Tau groups and separable from them mainly by genitalia (Fig. 116). This group possesses the following combination of diagnostic features: Epiphallus (top view) with a rather prominent, truncated median lobe. Pronotal width at least 1.75 times its length. FW at least 2.3 times as long as pronotum.

Tumpalia yurriyappa n. sp., Fig. 116ADH

RANGE. Type locality in northern NT.

RECOGNITION. Males: Central portion of pronotal disk darker than head. Pronotal disk with pale bands along front and back margins, the posterior pale band darkest at lateral edges and narrowest near median line. Side of head and pronotum as in Fig. 116H. File with 117 teeth. FW darkest in apical area; venation as in Fig. 116D. Lateral field of FW reddish-brown above, gradually becoming darker ventrally. Tibia III with 5 outer and 4 inner subapical spurs. Holotype measurements: Head slightly wider than front of pronotum. Front of pronotum 1.10 times as wide as rear and 1.88 times as wide as pronotal length. FW 2.79 times as long as pronotum. Femur III 1.53 times as long as tibia III. Tibia III 2.14 times as long as basitarsus III. Genitalia as in Fig. 116A. Body length 15 mm; FW 6.0 mm; femur III 8.5 mm; tibia III 5.6 mm; cerci 8.0 mm.

HOLOTYPE. ♂, A-102, 40 miles north of Tennant Creek, NT, 21 ix 1968, ANC.

SONG. Fig. 113. Groups of 9–11 2-pulse chirps at roughly 6 ch/s at 21°C.

	p/s	ch/s	p/ch	ch/group	kps	°C
A-102	39	6	2	9-11	4.6	21

HABITAT. Male found singing on ground and under a rock in open grassy country.

SPECIMENS. Holotype ♂ ANC.

Tumpalia yootha n. sp., Fig. 116BEG

RANGE. Type locality in northern NT.

RECOGNITION. Males: Similar to *T. yurriyappa*. Side of head and pronotum as in Fig. 116G. Genitalia as in Fig. 116B. FW similar to *T. yurriyappa*. Head 1.06 times as wide as front of pronotum. Front of pronotum 1.09 times as wide as rear and 1.85 times length of pronotum. FW 2.31 times as long as pronotum. Femur III 1.67 times as long as tibia III. Tibia III 1.72 times as long as basitarsus III. Body length 16.0 mm; FW 5.5 mm; femur III 9.0 mm; tibia III 5.3 mm; cerci 8.5 mm.

HOLOTYPE. ♂, Tindal, 8 miles ESE of Katherine, NT, 14.31S 132.22E, 16 xii 1967 (W. J. M. Vestjens) ANC.

SONG. Not known.

HABITAT. Uncertain, probably savanna grassland.

SPECIMENS. Holotype ♂ ANC. Same data as holotype ♂ ANSP.

Tumpalia ruficeps (Chopard), Fig. 116CFJ

Cephalogryllus ruficeps Chopard 1951: 406. Holotype ♂, Darwin, NT (G. F. Hill) SAM. Type examined.

RANGE. Northern NT.

RECOGNITION. Males: Very similar to *T. yurriyappa* and *T. yootha*. Side of pronotum similar to *T. yootha*. Genitalia (Fig. 116C) similar to *T. yurriyappa*. Disk of pronotum with pale bands along front and back margins. File with 101-130 teeth (n=4). Head slightly wider than front of pronotum. Front of pronotum about as wide as rear, and about 1.8 times as wide as pronotum. FW about 2.8 times as long as pronotum. Femur III about 1.6 times as long as tibia III. In a male from A-145 the pronotal disk lacks pale bands along front and rear margins; at front pale area on lateral lobes narrows down to point as it reaches onto disk. Pronotal disk of male from A-138 similar, except for narrow pale band along rear margin which almost disappears medi-

ally. Male from 8 miles ESE of Katherine, NT, bears just trace of posterior pale stripe. Files vary as follows: A-121 (104, 107 teeth); 145 (101); 138 (130). Tibia III 1.85 times as long as basitarsus III. Body length 12.5 mm; FW 5.5 mm; femur III 7.5 mm; tibia III 4.6 mm; cerci 8.3 mm. File with 107 teeth.

SONG. Fig. 113. Groups of 2-pulse chirps; groups comprised of 6-8 chirps.

	p/s	ch/s	p/ch	ch/ group	kps	°C
A-121	n=2	73	11.3, 11.4	2 (1)	6-8	5.2 33

HABITAT. Open country.

SPECIMENS. Holotype ♂ SAM. A-121 2♂ ANC. A-138 1♂ ANSP. A-145 1♂ UM. Tindal, 8 mi ESE Katherine 1♂ ANC.

LISTENING RECORDS. A-122, A-123, A-124, A-125, A-126, A-127, A-129, A-131, A-133, A-137, A-140, A-145, A-149, A-151, A-155, A-158, A-159, A-160.

Genus CYRTOPROSOPUS Chopard

Cyrtoprosopus Chopard 1951: 423. Type species: *C. stramineus* by original designation.

This genus, which includes a single species, appears to belong to the Aritella Genus Group. As in that group the tympana are on only the outer face of tibia I, and the epiphallus has two large lateral processes. Unlike other genera, the clypeus extends onto the dorsum of the head (Fig. 119A), the male FW's lack a mirror, and the hind tibiae are only about 0.6 times as long as the hind femur, harp with 1 or 2 veins.

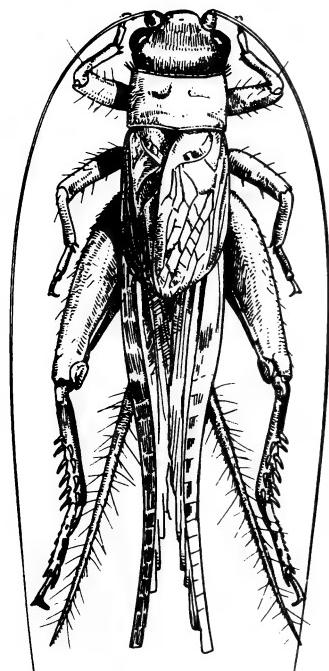
RECOGNITION. See above and species recognition.

Cyrtoprosopus stramineus Chopard, Figs. 117, 119A-E

Cyrtoprosopus stramineus Chopard 1951: 423. Holotype ♂, Owieandand, SA (A. P. Burgess) SAM. Type examined.

RANGE. Interior of SA, NSW, and QLD.

RECOGNITION. Males: Small pale yellowish or straw-colored. Clypeus extending onto dorsum of head. FW's slightly longer than head plus pronotum. HW's extending well beyond end of abdomen. FW's without mirror but with stridulum (Fig. 119CD). Harp with one or two veins. Stridulum with 47, 50 teeth (n=2). Tibia I with outer tympan-

FIG. 117. *Cyrtoprosopus stramineus*.

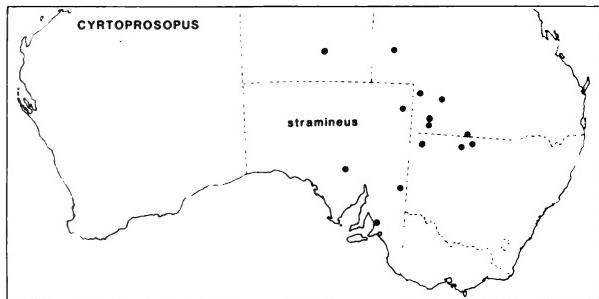
um only. Tibia III short, about 0.6 times as long as femur III and with 4 inner and 5 outer subapical spurs. Body length to end of HW 13–16 mm; FW length 2.5–3.5 mm; femur III length 4.8–5.5 mm; cerci 5.5–6.5 mm.

Females: Similar to males. Wing length as in males. Ovipositor ca. 1.4 times as long as femur III and 4.8 times as long as pronotum. Body length to end of HW 13.5–16.5 mm; femur III length 4.8–5.7 mm; cercal length 6–8 mm.

SONG. Not known.

HABITAT. Not known precisely. All specimens taken at lights. Short hind tibia and flattened head suggest this species lives under rocks or in other confined spaces such as under spinifex grass. Possibly displays HW dimorphism and only flying forms collected.

SPECIMENS. Holotype ♂ SAM. SOUTH AUSTRALIA: Wirraminna, 27 x 1953 (Tindale) 1♂ SAM. Adelaide, i 1951 (T.O.B.) 1♀ SAM. 32.17S 140.19E, 24 km WNW Olary, 20 xii 1970 (Britton et al.) 1♀ ANC. 27.20S 140.10E, near Coongie Lake, 13 x 1972 (Roffey-Mitchell) 1♂ ANC. NEW SOUTH WALES: 45 km ESE Hungerford (QLD), 15 xi 1971 (Lewis) ANC. Wittabrenna Ck, 20 km N Tibooburra, 25 iii 1972 (Lewis) 1♂ ANC. 2 mi WNW Tinchelooka Bore, nr Wanaaring, 31 x 1967 (Lewis) 1♀ ANC. 25 km S Enngonia, 30 x 1973 (Lewis) 2♀ ANC. QUEENSLAND: 29 km W Gilpeppie, nr Lake Yamma Yamma, 23 iii 1972 (Lewis)

FIG. 118. *Cyrtoprosopus* distributions.

1♀ ANC. Cooramarina Ck, 5 mi S Breadlabane HS, S of Boulia, 8 i 1969 (White) 1♂ ANC. 8 km S Kyabra HS, N of Eromanga, 22 iii 1972 (Lewis) 2♀ ANC. 1.5 mi S Noccundra, 28 i 1966 (Chinnick) 1♂ ANC. 2 mi NE Noccundra, 28 i 1965 (Chinnick) 1♀ ANC. 5 mi NE Noccundra, 3 iii 1965 (Chinnick) 1♀ ANC. 25 mi S Noccundra, 8 xi 1949 (Riek) 5♂ 5♀ ANC. NORTHERN TERRITORY: 53 km E by N Alice Springs, 6 x 1978 (Upton) 1♂ ANC.

INTRODUCED SPECIES

Genus **GRYLLODES** Saussure

Gryllodes Saussure 1874: 409. Type species. *Gryllus sigillatus* Walker, by monotypy.

This genus includes only the world-wide species, *G. sigillatus*. We have either heard or collected the species in the United States, Mexico, Panama, Argentina, Brazil, South Africa, Australia, and Hawaii. The original home of this species is unknown. The species is usually associated with human habitation, but is often found some distance away from such places, often occurring in rocky roadcuts and hillsides.

RECOGNITION. Tympana on outer face only. Mirror of FW's usually with single dividing vein (Fig. 120). Harp with two veins. Apical area of FW short. Posterior quarter pronotum dark. Spermatophore with large spermatophylax (Fig. 120).

Gryllus sigillatus (Walker), Figs. 119 FG, 120.

Gryllus sigillatus Walker 1869: 46. Holotype ♀, Swan River (we presume from Perth, WA) BM. Type examined.

RANGE. Widespread, associated with cities.

RECOGNITION. Males: Body pale brown to sandy-colored and with various dark spots and markings. Top of head (top view) usually banded as follows: dark brown anteriorly around median ocellus, then pale transverse band running between lateral ocelli,

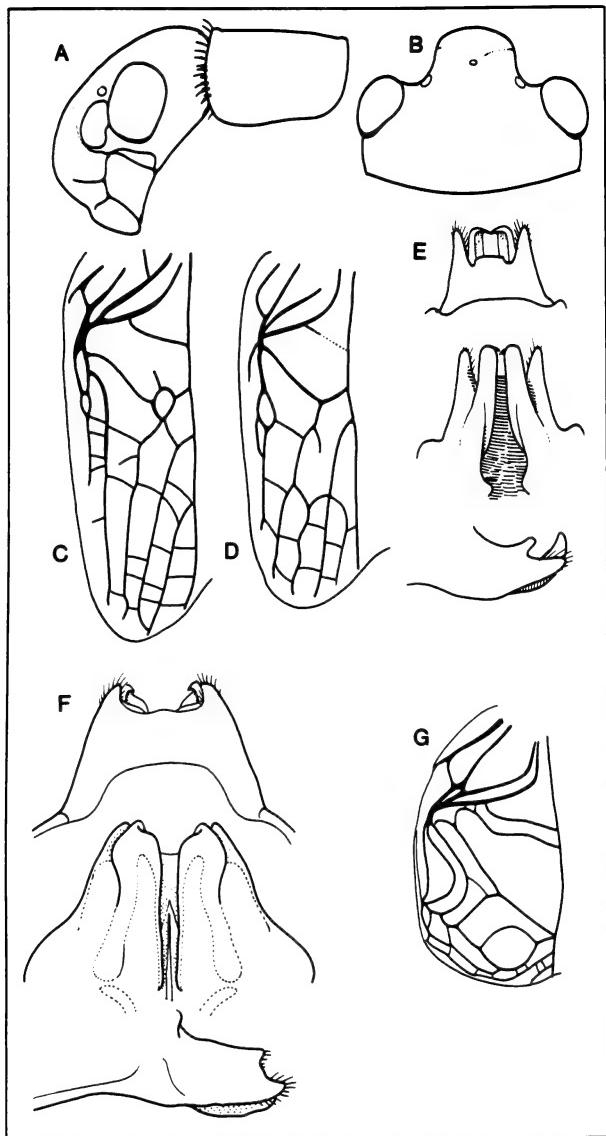


FIG. 119. *Cyrtoprosopus*, *Gryllodes*. A–E, *C. stramineus*: C, ♂ FW near Noccundra QLD; D, ♂ FW near Boulia QLD. F, *Gryllodes sigillatus*; G, *Gryllodes sigillatus*.

and behind that dark band running transversely between eyes, then pale brown to yellow vertex, then darker brown occiput. Disk of pronotum largely pale but with dark band along posterior margin; this band then extends ventrally onto lateral lobes and stops near lower front corner. Lateral lobes with dark area in upper front section. FW's darker than pronotum, with two harp veins and with once-divided mirror (Fig. 119G). Tympana on outer face only. Legs I and II very pale, whitish and with dark

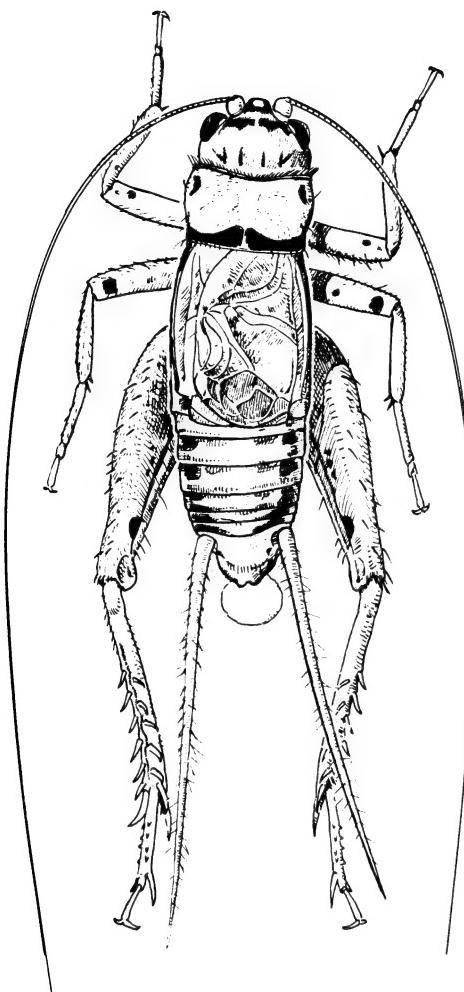
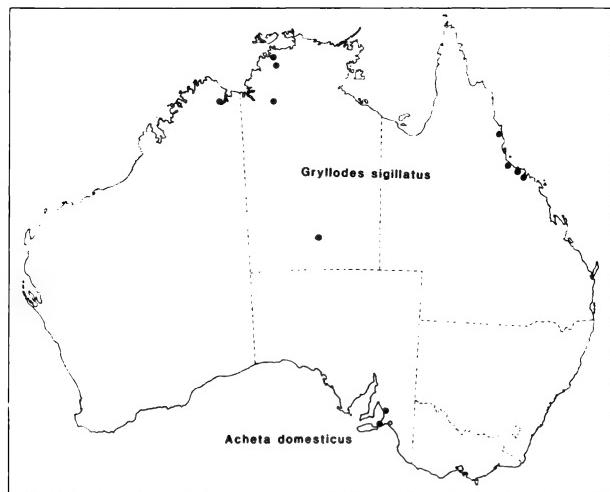


FIG. 120. *Gryllodes sigillatus*.

setae. Outer face of femora I and II with prominent dark brown spot and inner face of femur II with similar spot. Femur III with rows of dark brown spots (often sparse). Femur III with 5 inner and 5 outer subapical spurs. Cerci about 50% longer than femur III. Genitalia as in Fig. 119F. Spermatophore usually with spermatophylax. Body length ca. 20 mm.

Females: Similar to males. Ovipositor longer than femur III. FW's less than half as long as pronotum and not overlapping medially. First abdominal tergite usually distinctly darker than remaining tergites.

SONG. Fig. 67. Rapid succession of 1–4 pulse chirps (usually 3).

FIG. 121. *Gryllodes* and *Acheta* distributions.

	p/s	ch/s	p/ch	kps	°C
A-130	34	5	3	7.2	27
A-17	40	6	2-3	5.5	20
A-4	33-43	4.6-6	3-4	5.3-5.5	18

HABITAT. Usually found in rock and building crevices in or near human habitation, but sometimes some miles away from towns. Commonly inhabits roadcuts.

LISTENING RECORDS: Tape recorded or heard at the following localities: A-4. A-17. A-128. A-130. A-142. A-283. A-286. A-

662. A-665. Brisbane, QLD. Townsville, QLD. Cairns, QLD. Alice Springs, NT. 4 miles S of Coolibah HS, NT. Forest River Mission, WA. Perth, WA.

Genus **ACHETA** Fabricius

Acheta Fabricius 1775: 280. Type species: *Gryllus domesticus* Linnaeus 1758: 428, by ruling of the International Commission on Zoological Nomenclature.

Acheta contains nine known species, according to Chopard (1967), all from Africa and southwest Asia. But *A. domesticus* is now cosmopolitan.

Acheta domesticus (Linnaeus)

Gryllus domesticus Linnaeus 1758: 428.

For unknown reasons this cosmopolitan cricket, abundant in arid regions and associated with human habitations and refuse dumps in most parts of the world, has not become widespread in Australia. It is chiefly known in the vicinity of Adelaide, SA, where it was probably introduced. Although dense colonies have been observed there (Browning, per. comm.) it is not generally distributed in the Adelaide area and appears not to have spread from the original locale.

SPECIMENS. Adelaide, S. A. Glebe (33-52/151-11) Dept. Agric. NSW, ex cargo and tibre (sic) from S. S. Rideau Park. 3♀, 4♂, 1 juv., AM. Cape Jervis (35-38/138-06) Fleurien Peninsula, SA. ♂, SAM.

SUBFAMILY NEMOBIINAE

Chopard (1967: 158) treats this group as the Tribe Nemobiini under the subfamily Gryllinae. We do not follow his scheme here but adopt the traditional approach of treating the group as a separate subfamily. According to Chopard the group is composed of 17 genera and is distributed world-wide. The largest genus is *Pteronemobius* with 100 species.

Previously (Chopard 1951) three genera were known from Australia: *Pteronemobius*, *Nemobius*, and *Dictyonemobius*. We have made the following changes in the Australian Nemobiinae: (1) described five new genera and 22 new species (see list

below); (2) transferred the Australian *Nemobius* to the new genus *Bobilla*; (3) transferred *Dictyonemobius heteropus* to the new genus *Silvinella*.

HABITAT. In Australia the Nemobiinae are represented in most habitats except open deserts; there only flying individuals of species normally associated with moister habitats may occasionally be found. The usual habitats are stream banks and margins of billabongs and water tanks (*Pteronemobius*); open lush temperate and mountain grasslands (*Bobilla*); rain forest (*Silvinella*, *Specnia* and possibly *Tincanita*); caves and ground crevices

(*Nambungia*); and sandy and rocky marine coasts (*Apteronomobius* and *Thetella*).

CONDITION OF WINGS. Only *Pteronemobius* species are known to fly in Australia. *Bobilla* retains the FW's in both sexes but has no HW's or they are invisible. In *Specnia* and *Thetella* males possess FW's and females lack both sets of wings. In *Tincanita* males possess only the FW's (females are not known). In *Silvinella*, *Nambungia*, and *Apteronomobius* both sexes are completely wingless.

CONDITION OF AUDITORY TYMPANA. Auditory tympana are absent in all species in which males are wingless or have lost stridulatory teeth (*Silvinella*, *Nambungia*, and *Apteronomobius*). In *Tincanita* a rudimentary stridulatory vein without teeth is retained, but the tympana are also lost.

RECOGNITION. This subfamily differs from the subfamily Trigonidiinae in the characters listed below.

Small insects ranging in body length from 3–9 mm. Head with prominent bristles on vertex and frons (also present in Trigonidiinae and Phalangopsinae). Both sexes winged in most species; female wingless in some species; and both sexes wingless in some. Auditory tympanum when present located on outer face of tibia I. Tympana absent in wingless species; in general similar to Gryllinae, but average much smaller. Hind tibiae usually with long spurs; with 2–4 inner and 3–4 outer subapical spurs and with 2–3 inner and 3 outer apical spurs. Hind basal tarsal segments without dorsal spines (unlike Gryllinae). Harp of FW with 1 vein. Most likely to be confused with Trigonidiinae which also possess large bristles on head. But latter usually live on vegetation, have flattened middle tarsal segment, always have 3 inner and 3 outer subapical spurs, and have hind tibia as long as hind femur.

NEMOBIINAE

1. Tibia III with 3 inner and 3 outer apical spurs (except *Apteronomobius* and some *Thetella*—see Table 9).
2. Tibia III with 2–4 inner and 3–4 outer subapical spurs.
3. Middle tarsal segment small, laterally compressed and without enlarged pads.
4. Femur III more than 1.2 times as long as tibia III.

TRIGONIDIINAE

1. Tibia III with 2 inner and 3 outer apical spurs.
2. Tibia III with 3 inner and 3 outer subapical spurs.
3. Middle tarsal segment wide, dorso-ventrally flattened, usually with large pads.
4. Femur III length about equal to tibia III length.

KEY TO AUSTRALIAN GENERA OF NEMOBIINAE

1. Auditory tympana present on outer face of tibia I in both sexes. Male with FW's, female with or without FW's 5
Both sexes without auditory tympana. Males with or without FW's, females usually without FW's 2
2. Tibia III with 4 inner and 3 outer subapical spurs. Ovipositor strongly serrated on upper valves (Fig. 138J). Female with FW's *Narella*
Tibia III with 2 or 3 inner and 3 outer subapical spurs. Ovipositor not serrated on upper valves. Females without FW's 3
3. Tibia III with 3 inner and 3 outer subapical spurs and 3 inner and 3 outer apical spurs. (Not found along beaches) 4
Tibia III with 2 inner and 3 outer subapical spurs and 2 inner and 3 outer apical spurs. (Found on beaches and other tidal habitats along the coast) *Apteronomobius*
4. Males with FW's (these lack a stridulatory file). Dorsum of abdomen largely black but posterior margins of last 4 segments pale and each segment with pair of prominent white spots. Females unknown (probably without FW's). (Known only from SE QLD) *Tincanita*
Males and females without FW's. Dorsum of abdomen not as above 5
5. Male genitalia as in Fig. 136K. Female ovipositor less than 2.3 times as long as pronotum. (Forests of eastern QLD) *Silvinella*
Male genitalia as in Fig. 136H. Female ovipositor more than 2.5 times as long as pronotum. (Known species is from WA) *Nambungia*
6. Male tibia III with 4 inner subapical spurs, the first (most proximal one) is thickened and conical (Fig. 122ABC); both sexes with FW's. Base of abdomen with dorsal glands (usually hidden beneath wings) ... *Pteronemobius*
Male tibia III with 2 or 3 inner subapical spurs, with first (most proximal) one not thickened, and otherwise not fitting above description 7
7. Both sexes with FW's. Tibiae I and II clearly banded. (Species found in open country in ditches, moist grassy depressions and meadows in southern Australia; mountains of NSW, QLD, and in VIC) *Bobilla*
Males with FW's, females without FW's or with very tiny FW's. Tibiae I and II banded or unbanded. (Species found in tidal habitat, along coastal margins, or in forests) 8
8. Tibia III with 2 or 3 inner subapical spurs and 2 or 3 inner apical spurs. Inner spurs extremely lengthy and have long fringing hairs. (Tidewater species; usually found in coastal mangroves or among debris on beaches and shorelines) *Thetella*
Tibia III always with 3 inner subapical and 3 inner apical spurs. Not having long fringing hairs. (Forest species now known only from forests along Great Dividing Range of QLD) *Specnia*

TRIBE PTERONEMOBIINI

Genus PTERONEMOBIUS Jacobson and Bianchi

Pteronemobius Jacobson and Bianchi 1904: 450. Type species: *Nemobius tartarus* Saussure (now a synonym of *Pteronemobius concolor* Walker) (Chopard 1967: 160).

Chopard (1967) lists 93 species in this world-wide genus, four from Australia. We have added seven new species to the genus. The genus is best represented in eastern and northern Australia. At least some members of all species except *P. warrakarra* are capable of flight and most of these range widely over northern or eastern Australia. Most of the species except possibly *P. warrakarra* exploit periodically or temporarily moistened habitats and none seem to be able to tolerate permanently dry habitats.

RECOGNITION. FW's in both sexes longer than head and pronotum combined (usually shorter in *Bobilla* females). Both sexes frequently with HW's extending beyond end of abdomen. Posterior margin of FW's (viewed together) either truncated or convex but not strongly concave (Fig. 137) as is common in *Bobilla*. Male tibia III with 4 inner and 3 or 4 outer subapical spurs; first inner spur thickened and conical (Fig. 122ABC). Female tibia III with 3 or 4 inner spurs and 3 or 4 outer spurs. Ovipositor 1.8–2.8 times as long as pronotum (somewhat longer in some females of *P. gagooris*)

(2.9–4.5 times as long in *Bobilla*). Male FW venation as in Fig. 132. Females of *Pteronemobius* and *Bobilla* may be confused at times, but usually can be separated by FW shape, ovipositor length, and presence of distinct light and dark bands on head of latter (Fig. 137ABC).

The species of this genus fall into 5 groups; two of these include a single species.

KEY TO PTERONEMOBIUS SPECIES GROUPS

1. Occiput with 6–7 distinct longitudinal stripes (Fig. 131E). Pronotal disk with pale markings or pale spots (Fig. 131EH) *Ornaticeps* Group
- Occiput without 6 or 7 distinct pale stripes, but sometimes faintly banded. Pronotal disk not marked as above 2
2. Head, palpi, pronotum and all legs uniformly dark reddish brown and without any pale spots *Nundra* Group
- Head, pronotum and legs either pale or dark brown; if dark then always with pale spots 3
3. Head almost uniformly yellow-orange, lateral lobes of pronotum pale. Genitalia as in Fig. 130E. (Known only from Darwin area) *Warrakarra* Group
- Head and pronotum dark on sides. Genitalia not as above 4
4. Males and females with 4 inner and 4 outer subapical spurs. Last inner subapical spur (i-4) bent and thickened as in Fig. 122AB. Diagonal vein in males not strongly bent (Fig. 132ABC) *Truncatus* Group
- Males with 4 inner and 3 outer and females with 3 inner and 3 outer subapical spurs. Last inner subapical spur (i-4) not modified as in Fig. 122A. Diagonal vein strongly bent (Fig. 132J) *Regulus* Group

TABLE 9. Comparison of Australian genera of Nemobiinae.

	Number of subapical spurs (inner/outer)	Number of apical spurs (inner/outer)	Forewings		Auditory tympana	Ovipositor length Pronotal length
			♂	♀		
<i>Pteronemobius</i>	♂ ♀	4*/3 or 4*/4 4/3 or 3/3	3/3 3/3	+	+	present
<i>Bobilla</i>		3/3	3/3	+	+	present
<i>Specnia</i>		3/3	3/3	+	—	present
<i>Tincanita</i>		3/3	3/3	+	—?	present
<i>Silvinella</i>		3/3	3/3	—	—	absent
<i>Nambungia</i>		3/3	3/3	—	—	absent
<i>Thetella</i>		2/3 or 3/3	2/3 or 3/3	+	±	present
<i>Apteronomobius</i>		2/3	2/3	—	—	absent
<i>Narella</i>		4/3	3/3	+	+	absent

* First inner subapical spur thickened (Fig. 122ABC).

** All less than 2.9 except some specimens of *P. gagooris*.

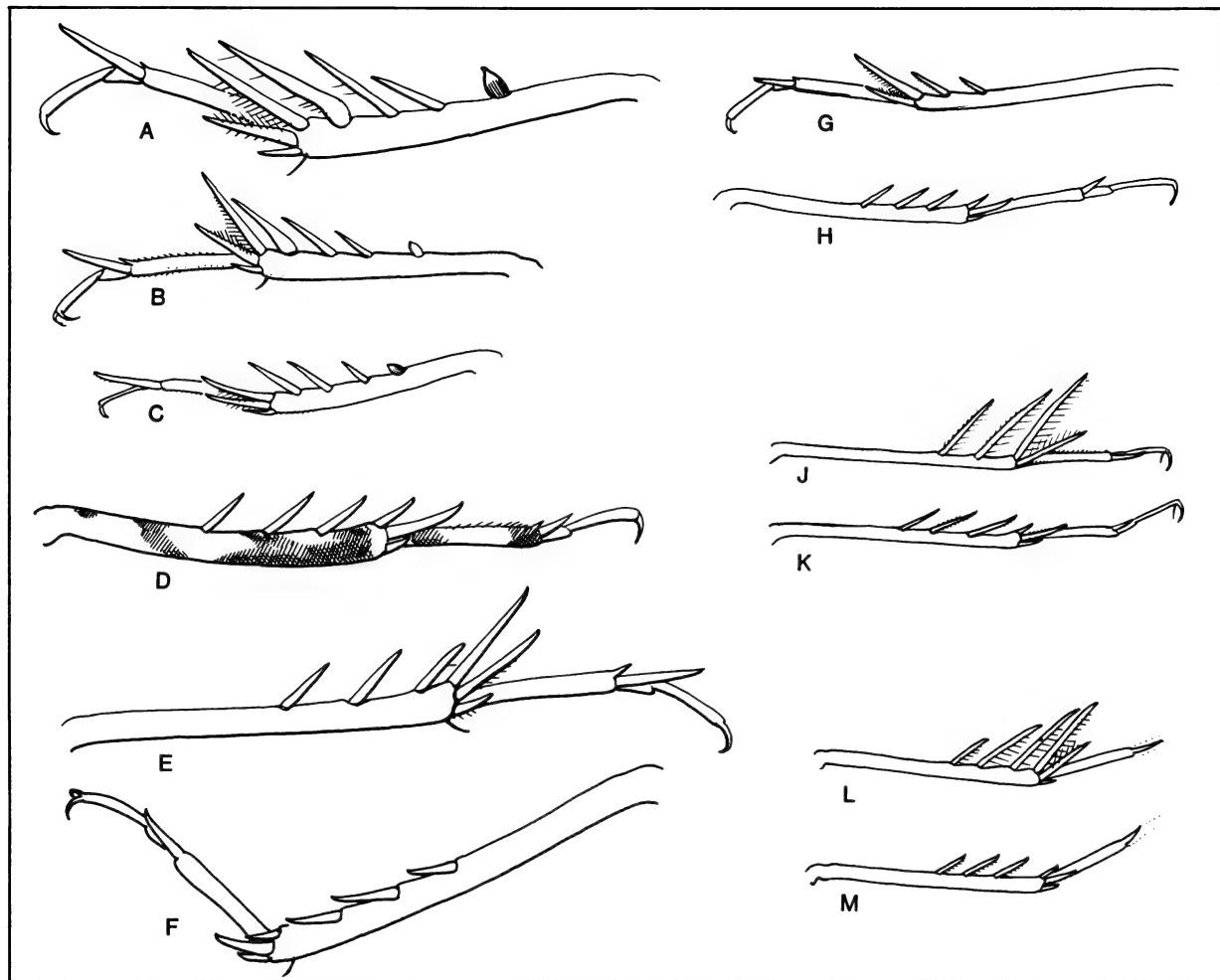


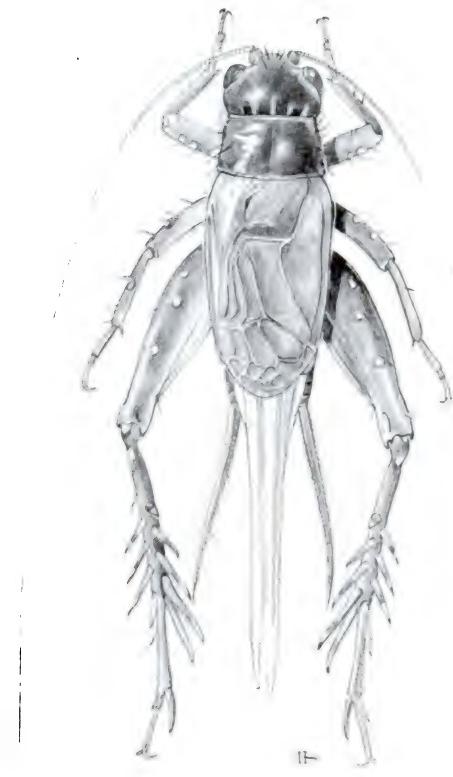
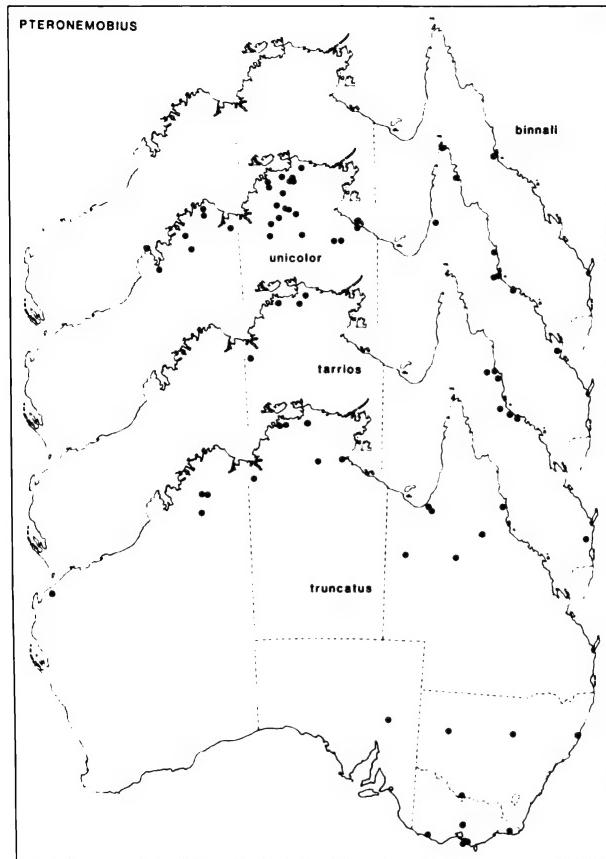
FIG. 122. Tibia III of various Nemobiinae. A, *Pteronemobius tarrios* (Truncatus Group) inner; B, *Pt. ornaticeps* inner; C, *Pt. regulus* inner; D, *Nambungia balyarta* outer; E, *Bobilla bivittatus* inner; F, *Tincanita tewah* outer; G, H, *Thetella tarnis* inner and outer resp.; J, K, *Apteronomobius darwini* inner and outer resp.; L, M, *Thetella* inner and outer resp.

TRUNCATUS GROUP

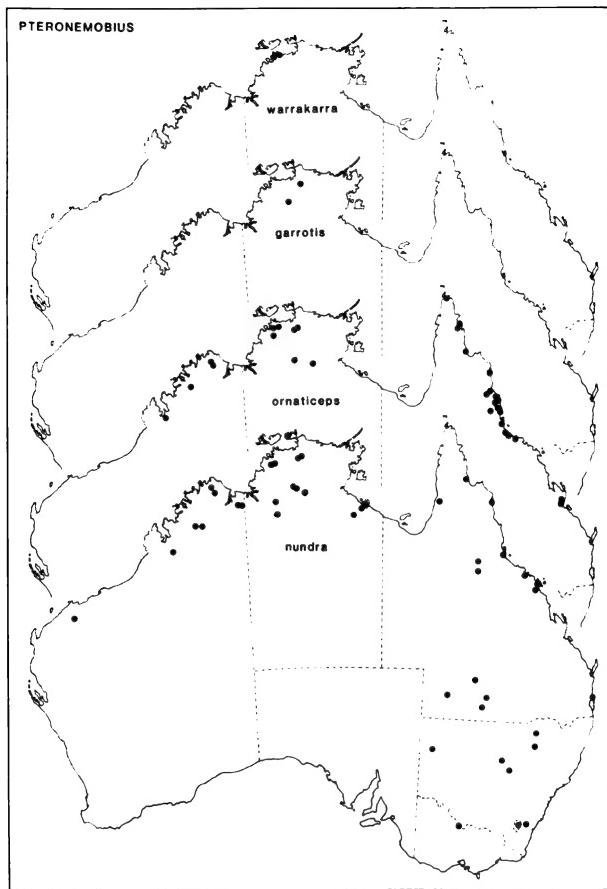
This group of species possesses the following combination of distinguishing features: Genitalia as in Fig. 130A–D. Tibia III in both sexes with 4 inner and 4 outer subapical spurs. Last inner subapical thickened and bent in males (as in Ornaticeps Group). Body length ca. 6–7 mm. Occiput of head not striped. Top of head and pronotum sometimes lighter than sides. FW venation as in Fig. 132AB. Diagonal vein never strongly bent as in Regulus Group. Legs if dark always with pale spots (without pale spots in Nundra Group).

KEY TO SPECIES OF TRUNCATUS GROUP

1. Tibiae I and II with pale spots on upper face near middle (Fig. 131G). Longest vein on female FW usually not forked in last quarter (Fig. 132T). Ovipositor less than 2 times as long as pronotum *unicolor*
Tibia I and II with at most a very faint lighter spot on upper face near middle. Longest vein on female FW almost always forked in last quarter (Fig. 132RS). Ovipositor more than 2 times as long as pronotum 2
2. Ovipositor 4.0 mm or more in length. Femur III 5.5 mm or more in length. Lateral pronotal lobes brown, not darker than pronotal disk *binnali*
Ovipositor 3.5 mm or less in length. Femur III 5.5 mm or less in length
... *truncatus-tarrios* Complex (see songs and distribution)

FIG. 123. *Pteronemobius tarrios* (macropterous).FIG. 124. *Pteronemobius* distributions.TABLE 10. Comparison of *Pteronemobius* species groups.

	Body length (mm)	Usual number of sub- apical spurs inner/outer	Last inner subapical spur bent/ thickened (Fig. 122A)	Chords Cu ₂ and 1A fused	Other distinguishing features
Truncatus Group	6–8	♂: 4/4 ♀: 4/4	yes/yes	no Fig. 132ABC	
Ornaticeps Group	ca. 6	♂: 4/3 ♀: 4/3	yes/yes	no Fig. 132F	occiput with 6–7 pale stripes
Nundra Group	5–6	♂: 4/3 ♀: 3/3	yes/no	no Fig. 132D	all legs dark brown and without pale spots
Warrakarra Group	ca. 7	♂: 4/3 ♀: 4/3	no/no	no Fig. 132Q	pronotum pale on lateral lobes
Regulus Group	3–6	♂: 4/3 or 4/4 ♀: 3/3	no/no	yes Fig. 132HJK or partially Fig. 132NOP	

FIG. 125. *Pteronemobius* distributions.

***Pteronemobius truncatus* (Saussure), Figs. 130AB, 132BS, 129ABC.**

Nemobius truncatus Saussure 1877: 91. Holotype ♀, "Australie," PM. Type examined.

Nemobius laparinthae Tepper 1896: 378. The type bears the following labels: "Museum Paris; Australia; J. Verreaux 2-47; 372; *Pteronemobius laparinthae* Tep, Chopard det.; probablement type de *truncatus* Saussure; Type; type of *truncatus* Saussure." The latter labels appear to have been written by Chopard. The specimen is a female which is in bad shape. PM. Chopard 1951 synonym. Type examined.

Pteronemobius mjöbergi Chopard 1925: 9. Holotype ♂, QLD (Mjöberg) PM. Chopard 1951 synonym. Type examined.

RANGE. Northern WA, northern NT, most of QLD, NSW, and VIC.

RECOGNITION. Males: Largely indistinguishable morphologically from *P. tarrios* and also similar to *P. unicolor*. The genitalia (Fig. 130AB) and wing venation virtually identical to those of *P. tarrios*.

Tibia III with 4 inner and 4 outer subapical spurs; first inner spur thickened, short and conical, last subapical bent and thickened (Fig. 122A). Males distinguished from *P. unicolor* by tibia II coloration (Fig. 131G). Females distinguished by tibia II coloration (Fig. 131G), ovipositor length (Fig. 129), and FW venation (Fig. 132S). Songs of *P. truncatus* have faster pulse rate than *P. tarrios*. The two species largely separated geographically (Fig. 124).

Females similar to males in color. Ovipositor about 0.61 times as long as femur III and 2.2-2.7 times as long as pronotum. HW's either hidden or exposed and very long.

SONG. Fig. 128. Short trills as often as 6 in 10 seconds with duration of 0.25-1.00 seconds, usually with 30-60 pulses, and increasing in intensity.

	p/s	p/ch	kps	°C
A-115	64-68	ca. 47	8.3-9.2	25
A-135	60.4	35	8.8	28
A-142	55-62	22-23	6.0-10.6	16
A-147	48	16	7.7	21.1
A-172	58-59	46	8.1	24
A-227	63-64	27-33	8.0-8.3	29
A-235	59	54	6.3	28
A-256	61	27-31	7.3-8.4	ca. 25
A-258	58	38	7.8	24
A-286	58	32	8.3	24-27
A-310	47	46	5.8	16
A-309	42.5	45	5.2	16
A-316	49	47	6.2	21
A-318	51	48	5.4	14
A-322	51	40	6.3	13
A-335	53-56	33+	6.5-7.5	14
A-360	46	33	6.0	13
A-408	60	44	7.1	31
A-481	58	36	8.3	22
A-780-1	53-54	55-62	7.5	23
A-782	57-59	60	6.6-7.2	23
A-713	52-54	27-32	7.3-7.8	26
A-810	55	ca. 40	7.0-7.4	23

HABITAT. Often found next to water holes, in grassy depressions and along rivers and creeks.

SPECIMENS. Holotype ♀ PM. A-67 1♂ ANSP. A-135 1♂ ANC. A-150 1♂ 1♀ UM. A-310 1♂ ANC. A-316 1♂ ANC. A-318 1♂ ANC. A-319 1♂ 1♀ ANC. A-322 1♂ ANC. A-330 2♂ ANC. A-335 1♀ ANSP. A-358 1♂ ANC. A-408 1♂ ANC. A-713 1♂ ANSP. A-780 1♂ ANC.

RECORDS OF SPECIMENS WITH NO SONGS (Includes *P. truncatus* and *P. tarrios*). WESTERN AUSTRALIA: 21.35S 117.04E, ½ km W Millstream HS, 2 iv 1971 (Riek) 1♀ ANC. 15.49S 125.37E, Prince Regent River Reserve, 23 viii 1974 (Baily, Richards), 1♂ ANC. Beverley Springs Station, 11 viii 1974

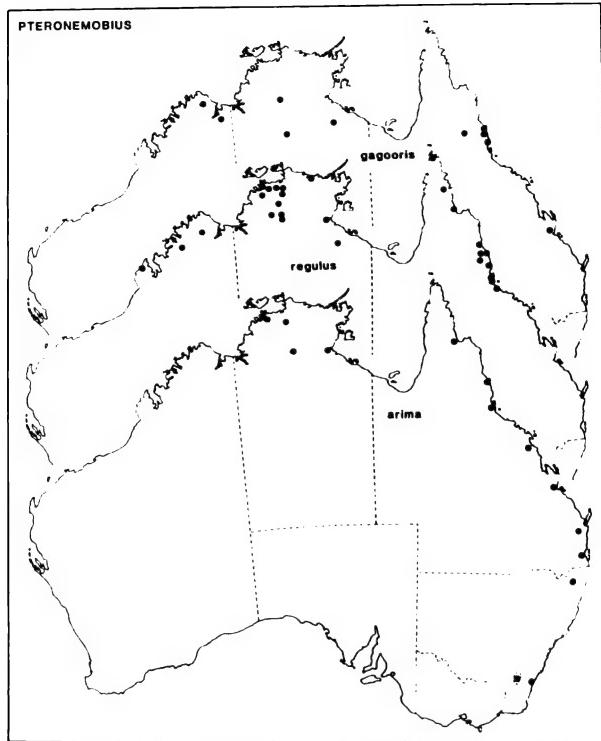


FIG. 126. *Pteronemobius* distributions.

(Bailey, Richards) 2♀ ANC. 14.49S 126.49E, Carson Escarpment, Kimberly dist., 9–15 viii 1975 (Common, Upton) 6♂ 3♀ ANC. 15.02S 126.55E, Drysdale R, Kimberly dist., 3–8 viii 1975 (Common, Upton) 1♂ 5♀ ANC. 15.19S 126.32E, Old Doongan, Kimberly dist., 2 iii 1975 (Common, Upton) 1♂ ANC. 17 mi SW of Halls Ck, 14 iv 1963 (Chinnick) 1♀ ANC. 21.35S 117.12E, 15 km E of Millstream HS, 20 x 1970 (Upton, Feehan) 1♂ 4♀ ANC. 21.37S 117.06E, 5 km SE of Millstream HS, 12 iv 1971 (Upton, Mitchell) 1♂ ANC. 21.37S 117.06E, 5 km SE of Millstream HS, 8 xi 1970 (Upton, Feehan) 1♂ ANC. 21.34S 117.03E, 3 km NW by W of Millstream HS; 5 iv 1971 (Upton, Mitchell) 1♂ ANC. 21.35S 117.04E, 1 km N of Millstream HS, 9 iv 1971 (Upton, Mitchell) 1♀ ANC. NORTHERN TERRITORY: Arnheim Land, Maningrida, 16 iii 1961 (Gressitt) 2♀ BISH. 12.43S 132.54E, 14 km SE Mudginbarry HS, 12 vi 1973 (Upton, Feehan) 1♂ 1♀ ANC. Waterfall Ck, near Sherana, 60 mi E Pine Creek, 7 viii 1964 (Carne) 1♂ ANC. 12.52S 132.50E, 15 km E Mt Cahill, 7 iii 1973 (Key et al.) 1♀ ANC. 15.54S 136.32E, Batten Point, 30 km NE by E Borroloola, 18 iv 1976 (Key, Balderson) 1♂ ANC. 16.39S 135.51E, McArthur R HS, 80 km SW of Borroloola, 13 v 1973 (Upton, Feehan) 1♀ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE of Mudginbarry HS, 25 v 1973 (Key) 1♀ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE of Mudginbarry HS, 7 xi 1972 (Upton et al.) 1♂ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE of Mudginbarry HS, 6 xi 1972 (Key et al.) 1♂ ANC. 12.25S 132.58E, 1 km N of Cahills Crossing, East Alligator R, 29 v 1973 (Key et al.) 1♀ ANC. 12.50S 132.51E, 16 km E by N of Mt. Cahill, 16 xi 1972 (Upton et al.) 2♂ 4♀ ANC. 12.48S 132.42E, Nourlangie Ck,

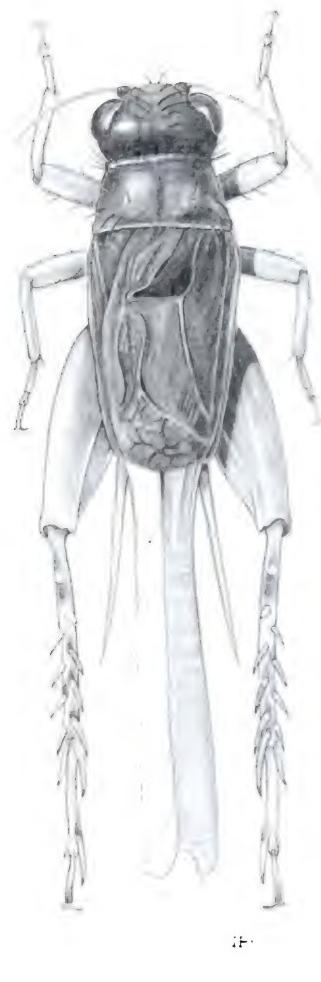
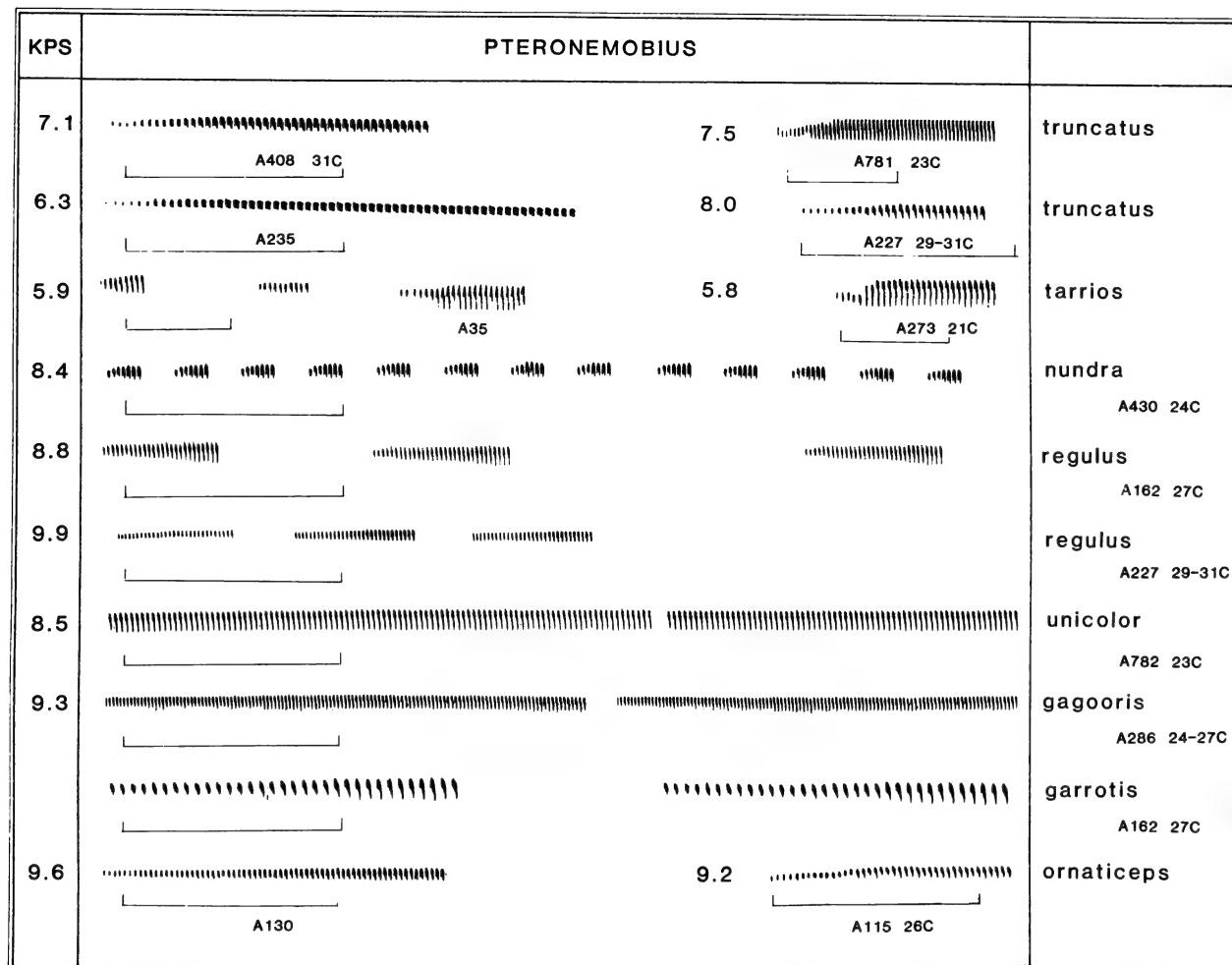


FIG. 127. *Pteronemobius regulus* (macropterous).

8 km N of Mt. Cahill, 19 xi 1972 (Upton et al.) 3♀ ANC. 12.48S 132.42E, Nourlangie Ck, 8 km N of Mt. Cahill, 26 x 1972 (Key et al.) 1♂ ANC. 12.46S 132.39E, 12 km NNW of Mt. Cahill, 25 x 1972 (Key et al.) 2♂ 6♀ ANC. QUEENSLAND: Cardstone, WNW of Tully, 14 ii 1966 (Hyde) 2♀ ANC. Yeppoon, 14 xii 1964 (Common) 1♀ ANC. Barron Falls, nr Kuranda, 21 xi 1964 (Brooks, Brooks) 1♀ ANC. Cardstone, 1 i 1966 (Hyde) 1♀ ANC. 18.58.5S 146.16E, Crystal Ck, 23 mi SSE of Ingham, 9 xii 1968 (Britton, Misko) 3♀ ANC. Cairns (Illingworth) 1♂ 4♀ BISH. Ingham, 19 ix 1960 (Harley) 1♀ ANC. Koombaloomba, 10 i 1962 (Britton) 2♀ BM. Cairns, 9–30 xii 1962 (Corbet) 1♀ BM. Redlynch, xi 1938 (Sternitzky) 1♀ BM. 10 mi S of Daintree, 29 iv 1955 (Norris, Common) 1♀ ANC. Koombaloomba, 20 mi S of

FIG. 128. *Pteronemobius* songs. Scale = 0.5 s.

Ravenshoe, 29 xii 1964 (Brooks) 1♂ 1♀ ANC. 26.00S 153.05E, Camp Milo, Cooloola Nat. Park, 16–20 x 1978 (Rentz, Balderston) 2♀ ANC. NEW SOUTH WALES: Cabramatta, 3 iii 1962 (Nikitin) 1♂ BM. Cabramatta, 15–20 i 1959 (Nikitin) 1♀ BM. Cabramatta, 6 iii 1962 (Nikitin) 1♂ BM. Cabramatta, 30 xi 1962 (Nikitin) 1♀ BM. 2 mi NNW of Matakana, 19 ii 1962 (Key, White) 1♂ ANC. Broulee, 24 ii 1962 (Upton) 2♂ 1♀ ANC. Broulee, 25 ii 1962 (Upton) 1♀ ANC. Bateman's Bay, 22 i 1963 (Common, Upton) 1♀ ANC. 2 mi W of Woodburn, 3 xi 1965 (Upton) 1♀ ANC. 18 km WNW of Bourke, 9 ii 1972 (Lewis) 3♂ 1♀ ANC. A.C.T.: Black Mt, 25 i 1962 (Common) 1♀ ANC. Black Mt, 16 ii 1962 (Common) 1♀ ANC. Black Mt, 1 xii 1964 (Common) 1♀ ANC. Black Mt, 1 ii 1969 (Common) 1♀ ANC. Black Mt, 8 i 1970 (Common) 1♀ ANC. Black Mt, 23 i 1968 (Common) 1♀ ANC. Black Mt, 11 i 1968 (Common) 1♂ ANC. Black Mt, 23 ii 1966 (Common) 1♀ ANC. Canberra, 11 ii 1951 (Carne) 1♀ ANC. Canberra, 3–4 iii 1951 (Carne) 2♀ ANC.

Pteronemobius tarrios n. sp., Figs. 122A, 123, 130C, 132ARS

RANGE. Distributed along coastal areas of NT, QLD and NSW.

RECOGNITION. Males: Largely indistinguishable from *P. truncatus*, but differing in song. File with 93–135 teeth ($n=11$). Tibia III with 4 inner and 4 outer subapical spurs. HW's either hidden or very long and extending beyond end of abdomen. Lacking a distinct pale spot on tibia II as in *P. unicolor*. Genitalia as in Fig. 130C. Forewing venation as in Fig. 130C. Head about as wide as pronotum. Holotype measurements: Pronotum 1.62 times as wide as long. FW 2.81 times as long as pronotum and

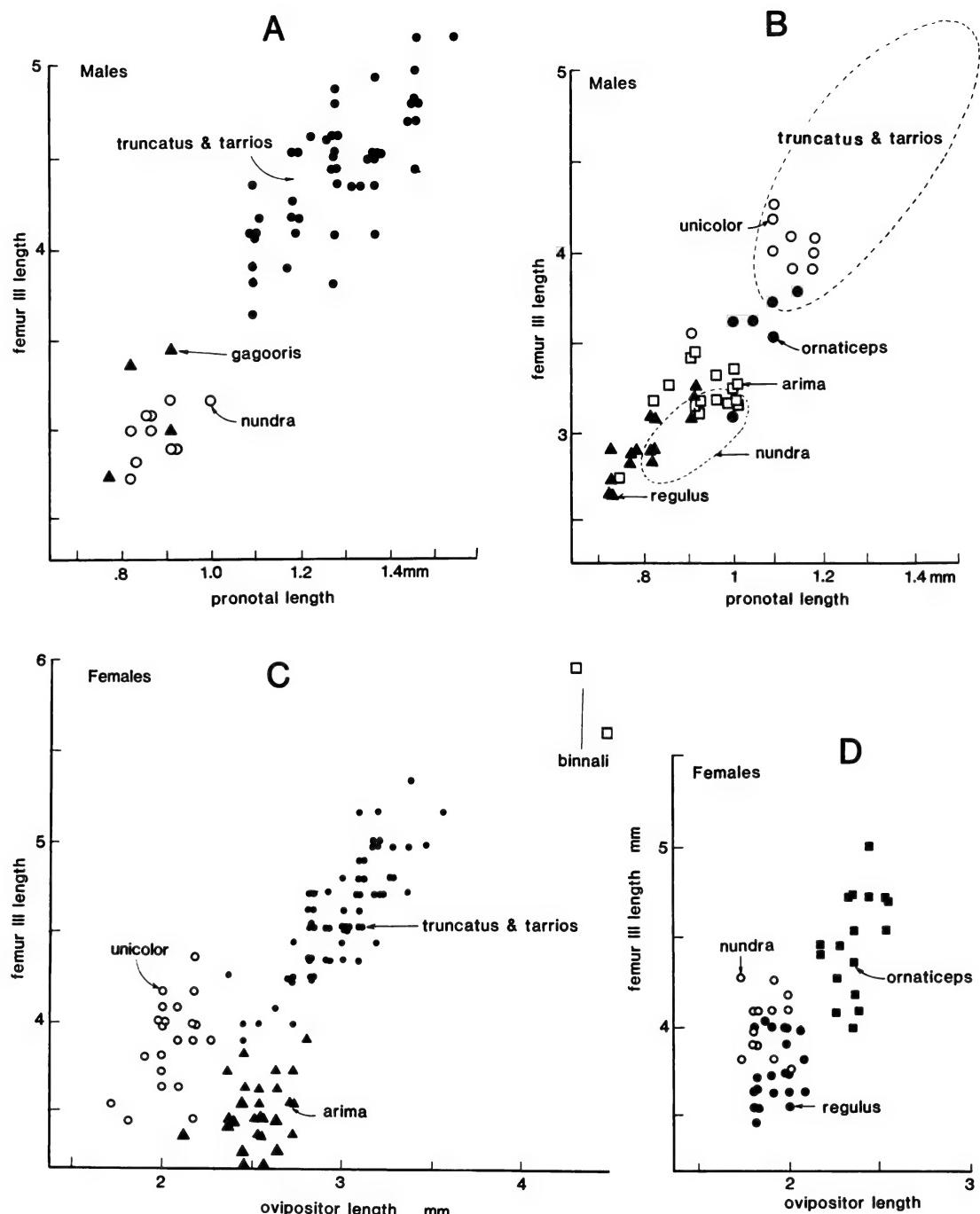


FIG. 129. *Pteronemobius* scatter diagrams comparing some similar species.

0.81 times as long as femur III. Femur III 1.29 times as long as tibia III. Latter 2.13 times as long as basitarsus III. Body length 6.5 mm; femur III 4 mm.

Females: Similar to males in size and coloration.

Ovipositor as in Fig. 123. Ovipositor 0.64–0.67 times as long as femur III or 2.0 times as long as pronotum. HW either hidden beneath FW's or extending well beyond end of abdomen. Differs from

P. unicolor in ovipositor length (Fig. 123) and FW venation (Fig. 132RS).

HOLOTYPE. ♂, A-35, Leichardt Creek, near Mount Malloy, QLD, 5 ix 1968, ANC.

SONG. Fig. 128. Succession of short trills (long chirps) with duration of 0.5 to 0.8 seconds (or 15–52 pulses). First $\frac{1}{4}$ to $\frac{1}{3}$ of trill contains pulses of lower intensity and lower frequency amplitude.

	p/s	p/ch	kps	°C
A-10	40.0	28	5.4–5.7	21–23
A-16	34–35	17	6.1–6.3	18
A-28	35–39	28	5.3–5.7	18
A-35	38–40	17–23	5.8–6.0	22–23
A-273	37.0	23	5.7	20.5

HABITAT. Moist areas along streams, ponds, and in roadside ditches. Usually not found in forests.

SPECIMENS. Holotype ♂ ANC. A-2 1♂ ANC. A-10 1♂ ANC. A-14 1♂ 1♀ ANSP. A-16 8♂ 8♀ ANC. A-26 1♂ ANC. A-35 1♂ 3♀ ANC. A-133 1♂ ANC. A-144 2♂ ANC. A-150 1♂ 1♀ ANC. A-172 1♂ ANC. A-273 1♂ UM.

Pteronemobius unicolor Chopard, Figs. 130D, 131G, 132CT

Pteronemobius unicolor Chopard 1925: 9. Holotype ♀, Cedar Creek, QLD (Mjöberg) SM. Type examined. Macropterous with glossy brown head and pronotum. Body length 7.25 mm; ovipositor 3.2 mm; femur III 5.25 mm.

RANGE. Northern WA and NT, and northern and eastern QLD.

RECOGNITION. Males: Very similar to *P. truncatus* and *P. tarrios* but differing in shape of epiphallus (Fig. 130D) in possessing distinct pale spot on tibia II (Fig. 131G), in body size (Fig. 129), and FW venation (Fig. 132C). Whereas previous two species tended to be lighter on top of pronotum than on sides, this species is uniformly dark reddish-brown. HW's either hidden or extending beyond end of cerci. File with 72–73 teeth ($n=3$). Typical male from Townsville has following measurements: Pronotum wider than head. Pronotum 1.5 times as wide as long. FW 2.71 times as long as pronotum and 0.86 times as long as femur III. Body length 6.5 mm; femur III ca. 4.3 mm; cerci ca. 3.7 mm.

Females: Ovipositor always less than 2 times as long as pronotum (always longer in *P. tarrios* and *P. truncatus*). Tibia II always with distinct pale spot (Fig. 131G). Longest vein on FW usually not

branching in last quarter. HW's either hidden or long and exposed.

SONG. Fig. 128. Continuous trill usually lasting over 5 s and up to at least 20 s. Several shorter trills recorded.

	p/s	kps	°C
A-55	62–64	6.8	17
A-19	62	5.8	21
A-782	80–81	7.5–8.5	23
A-166	74	—	29

HABITAT. Open grassy meadows and moist seepy areas.

SPECIMENS. Holotype ♀ SM. A-5 1♀ ANC, A-55 1♂ ANC. A-139 1♂ 1♀ ANSP. A-162 1♀ ANC. A-767 1♀ ANC. A-782 1♂ UM. WESTERN AUSTRALIA: Kimberley Research Stn via Wyndham, 12 v 1955 (Langfield) 1♂ 1♀ ANC. 15.02S 126.55E, Drysdale R, Kimberley dist, 3–8 viii 1975 (Common, Upton) 1♂ 3♀ ANC. 14.49S 126.49E, Carson Escarpment, Kimberley dist, 9 viii 1975 (Common, Upton) 1♂ 4♀ ANC. 17.23S 122.09E, 3 km S of Coulomb Point, W Kimberley dist, 20 iv 1977 (Colless) 1♀ ANC. 15.49S 125.37E, Prince Regent River Reserve, 23 viii 1974 (Baily, Richards) 1♀ ANC. NORTHERN TERRITORY: 12.57S 132.33E, Jim Jim Ck, 19 km WSW of Mt Cahill, 19 v 1973 (Key et al.) 3♂ 1♀ ANC. 12.57S 132.33E, Jim Jim Ck, 19 km WSW of Mt Cahill, 24 x 1972 (Key et al.) 1♂ 3♀ ANC. Katherine, 18 viii 1973 (Kelsey) 2♂ ANC. 12.23S 132.56E, 7 km NW by N of Cahills Crossing, East Alligator R, 4 xi 1972 (Key et al.) 2♀ ANC. 12.26S 132.58E, 1 km S of Cahills Crossing, East Alligator R, 3 xi 1972 (Key et al.) 1♂ ANC. 12.25S 132.58E, 1 km N of Cahills Crossing, East Alligator R, 8 xi 1972 (Upton et al.) 1♂ 1♀ ANC. 12.25S 132.58E, 1 km N of Cahills Crossing, East Alligator R, 29 v 1973 (Key et al.) 1♀ ANC. 12.17S 133.20E, Cooper Ck, 11 km S by W of Nimbuwah Rock, 1 xi 1972 (Key et al.) 1♀ ANC. 16.47S 135.45E, McArthur R, 14 km S by W of Cape Crawford, 11 iv 1976 (Key, Balderson et al.) 1♂ 1♀ ANC. 15.54S 136.32E, Batten Point, 30 km NE by E of Borroloola, 18 iv 1976 (Key, Balderson et al.) 1♂ 1♀ ANC. 12.46S 132.39E, 12 km NNW of Mt Cahill, 25 x 1972 (Key et al.) 1♀ ANC. 12.46S 132.39E, 12 km NNW of Mt Cahill, 20 x 1973 (Key et al.) 2♂ ANC. 12.52S 132.50E, 15 km E of Mt Cahill, 24 v 1973 (Key) 1♂ ANC. 12.52S 132.50E, 15 km E of Mt Cahill, 7 iii 1973 (Key et al.) 1♂ 1♀ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE of Mudginbarry HS, 6 xi 1972 (Key et al.) 2♂ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE of Mudginbarry HS, 7 xi 1972 (Upton et al.) 1♂ 1♀ ANC. 12.48S 132.42E, Nourlangie Ck, 8 km N of Mt Cahill, 21 v 1973 (Key et al.) 1♀ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE of Mudginbarry HS, 25 v 1973 (Key) 5♂ 3♀ ANC. 16.39S 135.51E, McArthur River HS, 80 km SW of Borroloola, 13 v 1973 (Upton, Feehan) 1♂ 1♀ ANC. 16.40S 135.51E, Bessie Spring, 8 km ESE of Cape Crawford, 26 x 1975 (Upton) 2♂ ANC. 6.4 km SSW of Victoria River Downs, along Wickham R, 18 vi 1973 (Kelsey) 1♂ ANC. 6.4 km SSW of Victoria R Downs, 17 vii 1973 (Kelsey) 1♀ ANC. 15.05S 133.07E, Elsey Ck, 19 km SSE of Mataranka, 14 v 1973 (Upton et al.) 2♀ ANC. 12.23S 132.57E, 5 km NNW

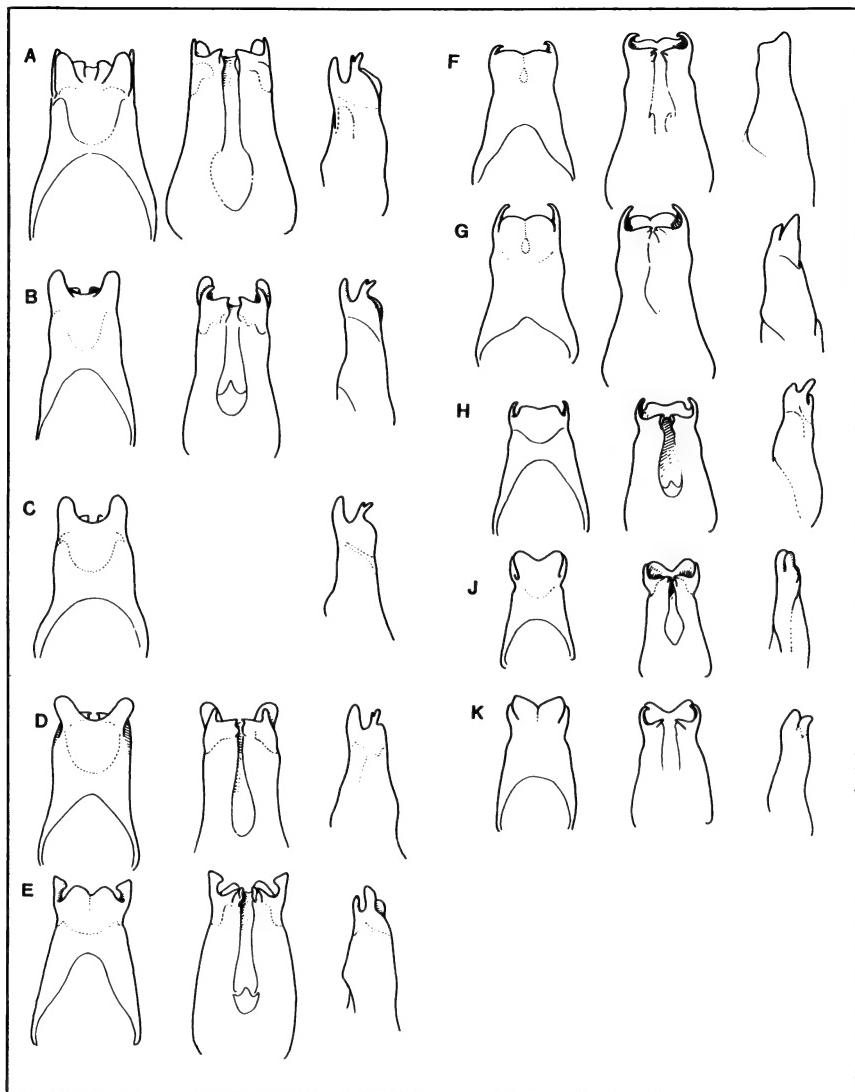


FIG. 130. *Pteronemobius* male genitalia (dorsal, ventral, and lateral views). A, B, *truncatus*; C, *tarrios*; D, *unicolor*; E, *warrakarra*; F, *ornaticeps*; G, *garrotis*; H, *nundra*; J, *regulus*; K, *gagooris*.

of Cahills Crossing, East Alligator R, 8 vi 1973 (Upton, Feehan) 1♂ ANC. 14.27S 131.14E, 8 mi WNW of Dorisvale HS, 21 ix 1968 (Mendum) 1♂ ANC. 15.34S 130.54E, 4 mi W by S of Coolibah HS, 13 vi 1968 (Mendum) 1♂ ANC. Howard Springs, 4 iii 1967 (Upton) 1♀ ANC. Humpty Doo, 6 vi 1966 (Langfield) 1♀ ANC. Darwin, 9 xii 1963 (Sedlacek) 2♂ 1♀ BISH. Arnhem Land, Maningrida, 17 iii 1961 (Gressitt) 1♂ BISH. Horn Islet, Pellew Group, 8–14 ii 1968 (Cantrell) 1♂ 1♀ uQC. Daly Waters, 19 vii 1978 (Reid) 1♀ ANC. 8 mi ESE Katherine, 12 xii 1967 (Vestjens) 7♂ 8♀ ANC. QUEENSLAND: Iron Range, 16 x 1976 (Holm) 1♀ ANC. Townsville, 25 i 1968 (Ferrar) 1♀ ANC. 19 mi WSW of Ingham, 1 iv 1962 (Chinnick, Corby) 1♀ ANC. Mitchell River Mission, 1 iv 1960 (Marks) 1♀ uQC. Yeppoon, 16 xii 1964 (Common) 1♂ ANC. Cannonvale, 1 iv 1967 (Upton) 1♂ 2♀ ANC. Moss-

man, 25 iii 1967 (Upton) 1♂ ANC. 2 mi ENE of Rollingstone, 26 iv 1969 (Common, Upton) 2♀ ANC. Gordonvale, 1918 (Illingworth) 1♀ BISH. Ingham, 2 iii 1961 (Harley) 3♂ 3♀ ANC. Ingham, 21 iii 1961 (Harley) 2♂ 8♀ ANC. Ingham, 7 iii 1961 (Straatman) 1♂ 1♀ ANC. Ingham, 7 iv 1961 (Harley) 2♀ ANC. Ingham, 15 iii 1961 (Harley) 1♀ ANC. Ingham, 29 iii 1961 (Harley) 6♂ 5♀ ANC. Ingham, 26 ii 1961 (Straatman) 1♂ ANC. Ingham, 16 ii 1960 (Harley) 1♀ ANC. Cape York, Lockerbie, 6–10 vi 1969 (Monteith) 1♂ uQC. Cape York, Silver Plains, 1 iv 1965 (Wassell) 3♀ ANC.

Pteronemobius binnali n. sp., Fig. 129C

RANGE. Type locality in north QLD coast.

RECOGNITION. Females: Largest *Pteronemobius*

species in Australia; body length ca. 8 mm, 13.5 mm to end of HW. Superficially most similar to *P. truncatus* and *P. tarrios* but differs as follows: Head entirely reddish-brown. Lateral lobes of pronotum no darker than disk; pronotum almost unicolorous light brown in one female, and slightly darker on disk than lateral lobes in other. Ovipositor 0.71, 0.79 times as long as femur III and 2.61, 2.88 times as long as pronotum. Ovipositor more than 4.0 mm long and femur III 5.5 mm long or more (ovipositor less than 3.5 mm and femur III less than 5.5 mm in *P. truncatus* and *P. tarrios*). Similar to latter two species in having 4 inner and 4 outer subapical spurs. In both females FW's extend well beyond ends of cerci.

HOLOTYPE: ♀, Ingham, Queensland, light trap, 21 iii 1961 (K. L. Harley) ANC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♀ ANC. Same data as holotype except 2 iii 1961, 1♀ ANC.

ORNATICEPS GROUP

The two known species in this group possess the following combination of characteristics. Body length ca. 6 mm. Top of head with 6 or 7 longitudinal pale lines. Pronotal disk with variegated pattern (Fig. 131E) or with small pale spots (Fig. 131H). Tibia III in both sexes with 4 inner and 3 outer subapical spurs; last subapical spur thickened and bent as in Truncatus Group. (See also Table 10.)

ornaticeps

1. Genitalia as in Fig. 130F.
2. File with fewer than 120 teeth.

garrotis

1. Genitalia as in Fig. 130G.
2. File with more than 130 teeth.

Pteronemobius ornaticeps Chopard, Figs. 130F, 131EHKL, 132F

Pteronemobius ornaticeps Chopard 1925: 7. Holotype ♀, Bellenden Ker, QLD (Mjöberg) sm. Type examined.

RANGE. Northern NT and northeastern coastal QLD.

RECOGNITION. Males: Occiput with 6–7 longitudinal pale stripes (Fig. 131E). Top of pronotum variable—from mottled brown and tan (Fig. 131E) to mostly dark reddish-brown with small pale spots

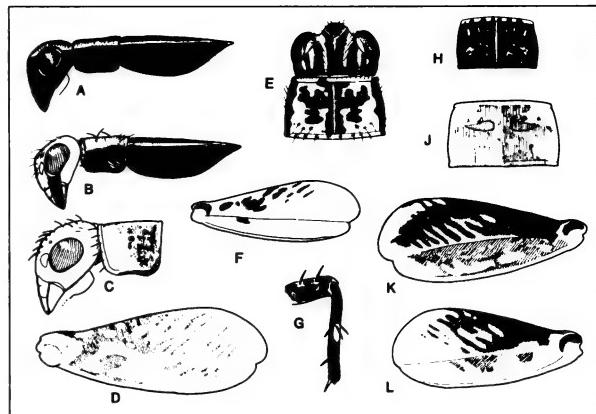


FIG. 131. *Pteronemobius*. A, *arima*; B, *gagooris*; C, *warakarra*; D, *warakarra* femur III; E, *ornaticeps*; F, *garrotis* femur III; G, *unicolor* leg II; H, *ornaticeps* pronotum; I, *warakarra* pronotum; K, L, *ornaticeps* femur III.

(Fig. 131H). In some dark individuals occipital stripes unclear, but pronotal disk bears distinct pale spots. Lateral lobes always very dark brown to blackish. Side and front of head reddish-brown. FW's usually with pale longitudinal stripe along wing angle. HW's either hidden or extending beyond end of abdomen. Femur III with light and dark markings—amount of brown increasing in darker specimens (Fig. 131KL). Genitalia as in Fig. 130F. FW venation similar to Fig. 132F. File with 83–113 teeth ($n=16$). Tibia III with 4 inner and 3 outer subapical spurs. First inner spur short and conical and last thickened and bent (similar to Truncatus Group). Files vary as follows: A-3 (89, 97 teeth); 4 (87); 33 (74, 83); 26 (91); 29 (86); 46 (94, 97); 115 (97, 97, 100); 133 (107); 142 (88); 130 (113).

Females: Tibia III with 4 inner and 3 outer subapical spurs. Coloration similar to males but top of abdomen varying from mostly brown to mottled brown and cream. FW's sometimes not reaching beyond middle of abdomen or about as long as head plus pronotum, sometimes nearly reaching end of abdomen. HW's sometimes hidden, sometimes extending well beyond end of abdomen. FW's with pale stripes running along wing angles. Ovipositor about 2.1–2.8 times as long as pronotum.

SONG. Fig. 128. Trill with duration varying from 0.65 to 2.5 seconds. At A-130 where trills were shorter, trill rate roughly 1.1 tr/s and pulses became more intense during trills. Possibly this is a different

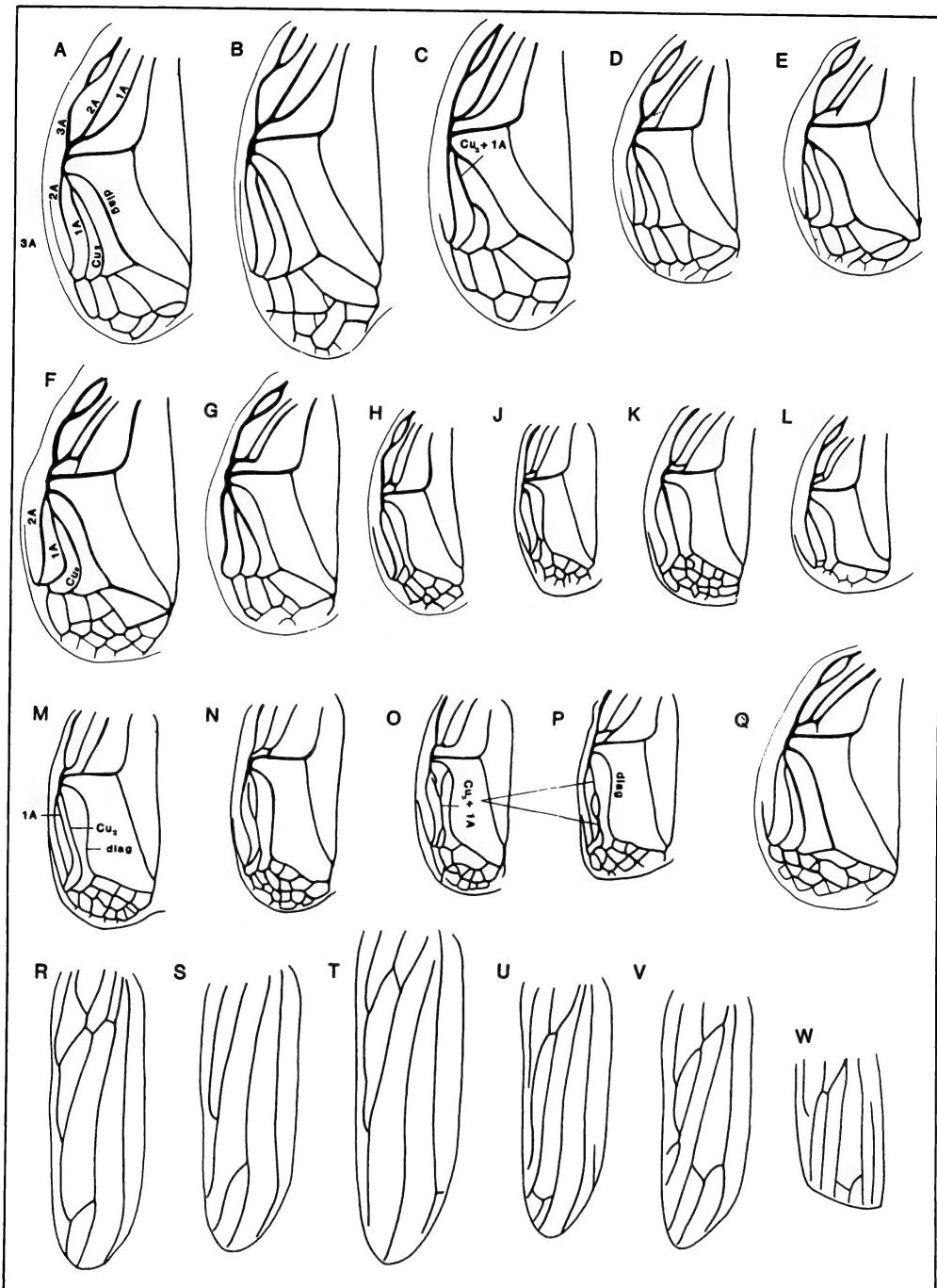


FIG. 132. *Pteronemobius* right FW, A-Q, males; R-W, females: A, *tarrios*; B, *truncatus*; C, *unicolor*; D, *nundra*; E, *nundra*; F, *ornaticeps*; G, *garrotis*; H, *regulus*; J, *regulus*; K, *gagooris*; L, *gagooris*; M-P, *arima*; Q, *warrakarra*; R, *tarrios* ♀; S, *tarrios-truncatus* ♀♀; T, *unicolor* ♀; U, V, W, *arima* ♀.

species. Male believed to have produced this song also had highest number of file teeth (113). But variation in length of trills and lack of obvious morphological differences leads us to believe a single species may be involved. Additional work on songs in NT should resolve this. Another song taped at A-767 is remarkably short and might belong to an uncollected species.

		trill length	p/s	(s)	tr/s	kps	°C
A-3	57–60	ca. 1.5	—	—	5.8–6.0	18	
A-4	85–91	ca. 1.8	—	—	7.2–7.5	22	
A-16	72–73	ca. 2.0	—	—	6.5–6.8	18	
A-24–25	70	ca. 2.0	—	—	6.3	ca. 21	
A-45	68	ca. 1.3	—	—	8.4	ca. 21	
A-62	64	ca. 2.0	—	—	5.7	ca. 21	
A-115	64–68	0.8	—	—	8.4	21	
A-130	83–85	0.65–0.80	ca. 1.1	—	9.6–11.0	27	
A-135	84.6	2.5	—	—	8.3	28	
?A-767	84	0.43	—	—	7.9	23	
A-35	80	1.5+	—	—	6.9	21–23	
A-10	80	1.5+	—	—	6.1	21–23	

HABITAT. Moist grassy areas or near water.

SPECIMENS. Holotype ♀ SM. A-3 1♂ UM. A-299 1♂ ANC. A-4 1♂ ANC. A-14 1♂ 1♀ ANC. A-26 1♂ 2♀ ANC. A-23 1♂ UM. A-33 2♂ ANC. A-45–46 3♂ 4♀ ANC. A-115 3♂ 2♀ ANC. A-130 2♂ 1♀ ANSP. A-133 1♂ ANC. A-142 1♂ ANC. QUEENSLAND: Lockerbie, Cape York, 6–10 vi 1969 (Monteith) 6♂ 1♀ UQC. Silver Plains, Cape York, 1 iv 1965 (Wessell) 1♂ ANC. Edge Hill, Cairns, 7 iii 1965 (Brooks) 1♂ 9♀ ANC. Edge Hill, Cairns, 24 iv 1965 (Brooks) 2♀ ANC. Cairns, 1917 (Illingworth) 5♀ BISH. Cairns, 1919 (Illingworth) 1♀ BISH. Cairns, 1920 (Illingworth) 3♀ BISH. Gordonvale, 1917 (Illingworth) 2♀ BISH. Gordonvale, 1918 (Illingworth) 3♀ BISH. Mossman, 25 iii 1967 (Upton) 1♂ 1♀ ANC. Freshwater, 18–19 iii 1965 (Brooks) 1♀ 1 juv. ANC. Freshwater, 22 ii 1965 (Brooks) 1♂ 3♀ ANC, 1♀ UQC. 15.28S 145.15E, Cooktown, 23 v 1976 (Britton) 1♀ ANC. Yeppoon, 10 iii 1970 (Norris) 1♀ ANC. Iron Range, 8 iv 1964 (Common, Upton) 1♂ ANC. Iron Range, 11 vii 1968 (LeSouef) 1♀ UQC. 9 mi E of El Arish, 7 iii 1964 (Common, Upton) 1♀ ANC. Ingham, 2 iii 1961 (Harley) 1♂ 1♀ ANC. Ingham, 7 iii 1961 (Straatman) 1♀ ANC. Ingham, 21 iii 1961 (Harley) 1♂ 1♀ ANC. Ingham, 29 iii 1961 (Harley) 1♂ 1♀ ANC. Ingham, 7 iv 1961 (Harley) 1♀ ANC. Mt Bartle Frere, E base, 24 iv 1955 (Norris, Common) 3♀ ANC. Homestead, Silver Plains, E Coast Cape York Peninsula, 22 iii 1960 (Wassell) 1♀ ANC. Barron Falls nr Kuranda, 12 xii 1964 (Brooks) 1♂ 3♀ ANC. Barron Falls nr Kuranda 2 i 1965 (Brooks) 1♂ ANC. Barron Falls, nr Kuranda, 21 xi 1964 (Brooks, Brooks) 1♀ ANC. Cardstone, Tully Falls, 23 i 1965 (Brooks) 2♀ ANC. Cape York, Top Rocky Yard, Rocky R, NE of Coen, 30 iv 1961 (Gressitt, Gressitt) 2♀ BISH. NORTHERN TERRITORY: Howard Springs, 4 iii 1967 (Upton) 2♂ ANC. Humpty Doo, 6 vi 1966 (Langfield) 1♀ ANC.

11.07S 132.08E, Smith Point, Cobourg Pen, 4 ii 1977 (Lewis) 1♀ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 19 ii 1977 (Weir) 1♀ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 22 ii 1977 (Weir) 1♀ ANC. Darwin, 23 vi 1972 (Upton) 2♀ ANC. Daly River Miss, 26 viii 1974 (Hutchinson) 3♂ ANC. 12.52S 132.50E, 15 km E of Mt Cahill, 8 iii 1973 (Key et al.) 1♀ ANC. 12.57S 132.33E, Jim Jim Ck, 19 km WSW of Mt Cahill, 19 v 1973 (Key et al.) 1♂ ANC. 12.46S 132.39E, 12 km NNW of Mt Cahill, 20 v 1973 (Key et al.) 1♂ ANC. 12.48S 132.42E, Nourlangie Ck, 8 km N of Mt Cahill, 21 v 1973 (Key et al.) 1♀ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE of Mudginbarry HS, 25 v 1973 (Key) 1♂ 1♀ ANC. 12.31S 132.54E, 9 km N by E of Mudginbarry HS, 26 v 1973 (Key et al.) 1♂ ANC. 12.46S 132.39E, 12 km NNW of Mt Cahill, 25 x 1972 (Key et al.) 1♂ ANC. 12.50S 132.51E, 16 km E by N of Mt Cahill, 16 xi 1972 (Upton et al.) 1♂ 1♀ ANC. 8 mi ESE Katherine, 20 xii 1967 (Vestjens) 1♂ ANC. WESTERN AUSTRALIA: 15.19S 126.32E, Old Doongan, Kimberley dist, 2 viii 1975 (Common, Upton) 2♀ ANC. 15.02S 126.55E, Drysdale R, Kimberley distr, 3–8 viii 1975 (Common, Upton) 8♀ ANC. 14.39S 126.57E, Drysdale R, Kimberley distr., 21 viii 1975 (Common, Upton) 1♀ ANC. 14.49S 126.49E, Carson Escarpment, Kimberley distr, 9–15 viii 1975 (Common, Upton) 1♀ ANC. Bev. Springs Statn, 11 viii 1974 (Bailey, Richards) 1♀ ANC. 15.07S 125.33E, Prince Regent River Reserve, 15 viii 1974 (Bailey, Richards) 1♀ ANC. 15.49S 125.37E, Prince Regent River Reserve, 23 viii 1974 (Bailey, Richards) 2♀ ANC.

Pteronemobius garrotis n. sp., Figs. 130G, 132FG

RANGE. Northern NT.

RECOGNITION. Males: Very similar to *P. ornaticeps*, and sharing with that species 7 stripes on top of head, pale markings on top of pronotum, nearly black lateral lobes, dark lateral field of FW, and patterned hind femora (as in Fig. 132F). Differing in genitalia (Fig. 130G), and in having more file teeth (149 teeth, n=1). Legs I and II in only existing specimen largely dark brown as in *P. nundra*, but this species with pale spots on legs and hind femur not uniformly brown. Palpi largely brown (unlike *P. arima*, but like *P. nundra*). Pronotum 1.52 times as wide as long. FW 2.6 times as long as pronotum and 0.78 times as long as femur III. Femur III 1.35 times as long as tibia III. Latter 2.1 times as long as basitarsus III. Body length ca. 6.0 mm; femur III length ca. 3.3 mm.

HOLOTYPE. ♂, A-147, 18 miles west of East Alligator River, E of Darwin, NT, 28 ix 1968, ANC.

SONG. Fig. 128. Short trill with 16–33 pulses (n=2).

	p/s	p/ch	°C
A-147	47.3	16	21
A-162	47.3	33	27

HABITAT. Large numbers heard in mud cracks around water hole.

SPECIMENS. Holotype ♂ ANC. A-162 ANC.

NUNDRA GROUP

This "group" which includes only one species can be recognized by its uniform dark reddish cast on the head, pronotum, abdominal sclerites and legs. It is most similar in color to *P. unicolor* of the Truncatus Group but differs in lacking any pale spots on the legs and in having 3 instead of 4 outer subapical spurs in both sexes and 3 inner spurs in females. The diagonal vein in the male FW is not strongly bent as in the Regulus Group. Unlike the Regulus Group the Cu₂ and 1A veins are not wholly or largely fused (Fig. 132E).

Pteronemobius nundra n. sp., Figs. 129ABD, 130H, 132DE

RANGE. Widespread over eastern and northern Australia.

RECOGNITION. Males. Similar in color to *P. unicolor* but tibia III with 4 inner and 3 outer subapical spurs. Similar to *P. regulus* but body uniformly dark reddish-brown including legs, palpi, and venter of abdomen. Some individuals of *P. ornaticeps* quite dark, but with lighter spots on legs and pronotal disk and venter of abdomen not dark. Some *P. regulus* have dark legs, but always with small pale spots on dorsum of femur III, intersegmental membrane of abdomen pale, and cerci pale brown. Dorsum of head becoming distinctly lighter in region between lateral ocelli and antennae. Clypeus and labrum pale, yellowish, and clypeus arching upwards medially. Legs without pale spots as in Truncatus Group. Hind femora uniformly dark reddish-brown and without oblique stripes. Genitalia as in Fig. 130H. FW venation as in Fig. 132DE. File with 100–132 teeth (n=6). FW brown, not darker on lateral field than dorsal field. Tibia III with 4 inner and 3 outer subapical spurs. First inner spur thickened as in other *Pteronemobius*, last inner subapical bent but not thickened. *P. unicolor* usually has femora spotted with pale markings. Body length 5–6 mm. Holotype measurements: File with 120 teeth. Pronotum 1.65 times as wide as long. FW 3.55 times as long as pronotum and 1.08 times as long as femur III. Femur III 1.32 times as long as tibia III. Latter 1.79 times as long as basitarsus III.

Body length 6.2 mm; femur III length 3.2 mm; cerci ca. 2.7 mm.

HOLOTYPE. ♂, A-430, 6 miles south of Kerang, VIC, 11 ii 1969, ANC.

Females: Same color as males. Ovipositor about 1.9–2.4 times as long as pronotum. Tibia III with 3 inner and 3 outer subapical spurs.

SONG. Fig. 128. Succession of 5 to 10 pulse chirps. Song taped at A-481 with faster pulse rate may not belong to this species. Song taped at A-10 also doubtful being somewhat slow and low-pitched. Song taped at A-141 also doubtful.

	p/s	ch/s	p/ch	kps	°C
A-141	87	4.1	10	6.4	22
?A-141	70	4.4	8	7.7	22
A-172	89–92	5.6	7	9.1	24
A-318	65–75	4.6	5–7	6.5–7.0	15.5
A-430	88–89	5.9–6.4	7	8.6–9.1	24
A-477	83–89	6.3–6.7	6–8	8.8–9.2	28
A-481	80	5.4	8–9	8.2	22
?A-481	109	5.7	9–10	6.5	22
A-495	83.5	6.2	7–8	9.1	26
A-781	70	4.3–4.4	7–8	7.1–7.4	23
?A-10	53	2.9	8	3.6	21

HABITAT. Wet seepage areas and grassy ditches; sometimes beneath soil surface, and usually in open country. Sometimes found under stones in dry creek beds.

SPECIMENS. Holotype ♂ ANC. A-39 1♂ ANSP. A-141 1♂ UM. A-172 1♂ ANC. A-318 1♂ ANC. A-335 1♂ ANC. A-430 1♂ ANC. A-444 1♂ ANC. A-780 1♂ ANC. QUEENSLAND: Cape York, Silver Plains, 1 iv 1965 (Wassell) 1♂ 1♀ ANC. Ingham, 15 iii 1961 (Harley) 1♂ ANC. Ingham, 21 iii 1961 (Harley) 3♀ ANC. Ingham, 29 iii 1961 (Harley) 10♂ 6♀ ANC. Ingham, 2 iii 1961 (Harley) 1♂ 10♀ ANC. 40 mi S of Ayr, 10 ix 1950 (Riek) 1♀ ANC. Bribie Isl, 18–26 xii 1972 (Kohout) 1♀ ANC. Halifax, iv 1920 (Muir) 1♂ BISH. Mitchell River Mission, iv 1960 (Marks) 1♀ uqc. Cannavale, 1 iv 1967 (Upton) 1♂ ANC. 7 km NW of Cunnamulla, 19 iii 1972 (Lewis) 2♂ 2♀ ANC. 26.32S 146.12E, 15 km S by W of Charleville, 21 x 1975 (Upton) 2♂ ANC. 15.25S 145.03E, 21 km W by N of Cooktown, 17 v 1977 (Common, Edwards) 1♂ ANC. 27.35S 145.51E, 4 km S of Ardrossan HS, nr Wyandra, 28 ix 1977 (Rentz, White) 1♂ 1♀ ANC. 30 mi N Nocatunga, 10 xi 1949 (Riek) 1♀ ANC. WESTERN AUSTRALIA: Ivanhoe, 7 iv 1962 (Common) 1♀ ANC. Kimberley Research Stn. via Wyndham, 12 v 1955 (Langfield) 3♂ 6♀ ANC. Kimberley Research Stn. via Wyndham, 14 vi 1955 (Langfield) 1♂ 1♀ ANC. 15.02S 126.55E, Drysdale R, Kimberley distr., 3–8 viii 1975 (Common, Upton) 1♀ ANC. 14.49S 126.49E, Carson Escarpment, Kimberley distr., 9–15 viii 1975 (Common, Upton) 2♀ ANC. Kimberley Research Stn. via Wyndham, 22 iii 1955 (Langfield) 1♀ ANC. Myrooda

Crossing, Fitzroy R, 16–24 v 1951 (Guppy) 1♂ ANC. 21.35S 117.04E, ½ km W of Millstream HS, 2 iv 1971 (Riek) 1♀ ANC. Myrooda Crossing, Fitzroy R, 28 v to 6 vi 1951 (Guppy) 2♀ ANC. Myrooda Crossing, Fitzroy R, 2–15 vi 1951 (Cohen) 1♂ ANC. 21.36S 117.07E, 4 km ESE of Millstream HS, 18 iv 1971 (Upton, Mitchell) 1♂ ANC. 21.35S 117.04E, 1 km N of Millstream HS, 23 x 1970 (Upton, Feehan) 1♀ ANC. 21.35S 117.04E, 1 km NNE of Millstream HS, 10 iv 1971 (Upton, Mitchell) 1♀ ANC. 21.35S 117.04E, 1 km NE of Millstream HS, 15 iv 1971 (Upton, Mitchell) 1♀ ANC. NORTHERN TERRITORY: 14.31S 132.22E, Tindal, 8 mi ESE Katherine, 6 xii 1967 (Vestjens) 3♂ 4♀ ANC. 12.50S 132.51E, 16 km E by N of Mt Cahill, 29 x 1972 (Key et al.) 1♂ ANC. 12.26S 132.58E, 1 km S of Cahills Crossing, East Alligator R, 3 xi 1972 (Key et al.) 1♀ ANC. 12.57S 132.33E, Jim Jim Ck, 19 km WSW of Mt Cahill, 24 x 1972 (Key et al.) 1♀ ANC. 12.31S 132.54E, 9 km N by E of Mudginbarry HS, 30 x 1972 (Key et al.) 1♀ ANC. 16.47S 135.45E, McArthur R, 14 km S by W of Cape Crawford, 11 iv 1976 (Key, Balderson et al.) 1♂ ANC. 15.54S 136.32E, Batten Point, 30 km NE by E of Borroloola, 18 iv 1976 (Key, Balderson et al.) 1♀ ANC. 6.4 km WSW of Victoria Riv. Downs, 13 vi 1973 (Kelsey) 1♂ ANC. 6.4 km SSW of Victoria Riv. Downs, 14–17 vii 1973 (Kelsey) 1♀ ANC. 8 km WSW of Victoria Riv. Downs, 12 ix 1973 (Kelsey) 1♀ ANC. Humpty Doo, 30 v 1966 (Langfield) 3♂ ANC. Humpty Doo, 6 vi 1966 (Langfield) 7♀ ANC. Arnhem Land, Maningrida, 5 m, 20 iii 1961 (Gressitt, Gressitt) 1♀ BISH. Mataranka, 1 iii 1967 (Upton) 1♂ 1♀ ANC. Howard Springs, 4 iii 1967 (Upton) 1♀ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 24 i 1977 (Bakker) 1♀ ANC. 16.32S 136.10E, Cattle Ck, 54 km S by W of Borroloola, 27 x 1975 (Upton) 1♀ ANC. 12.46S 132.39E, 12 km NNW of Mt Cahill, 20 v 1973 (Key et al.) 1♂ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE of Mudginbarry HS, 25 v 1973 (Key) 1♂ ANC. Katherine, 17–18 viii 1973 (Kelsey) 1♀ ANC. Daly Waters, airfield, 28 vii 1978 (Reid) 1♀ ANC. Horn Islet, Pellew Group, 8–14 ii 1968 (Cantrell) 1♀ UQC. 15.34S 130.54E, 4 mi W by S of Coolibah HS, 15 ix 1968 (Mendum) 1♂ ANC. NEW SOUTH WALES: Nelligen, 21 xii 1959 (Key) 1♂ ANC. 65 NW Nyngan, 21 x 1949 (Riek) 2♂ 1♀ ANC. Moree, 29 x 1951 (Dyce) 2♂ 1♀ ANC. Moree, 1919 (Froggatt) 2♀ ANC. Mount Boppy, 25 xi 1949 (Riek) 1♀ ANC. Trangie Exp Sta, 4 mi NNW of Trangie, 10 xi 1968 (Lewis) 1♀ ANC. Trangie, 23 ii 1951 (Cameron) 1♀ ANC. Trangie, 20 x 1949 (Riek) 2♂ 3♀ ANC. Trangie, 20 x 1949 (Paramonov) 1♂ 1♀ ANC. Narrabri, 26 i 1960 (Nikitin) 3♂ 5♀ BM. Cabramatta, 21 i 1966 (Nikitin) 1♀ BM. Narrabri, 28 xii 1959 (Nikitin) 1♀ BM. Narrabri, 25 i 1960 (Nikitin) 1♂ 2♀ BM. Cabramatta, 6 i 1958 (Nikitin) 1♀ BM. ACT: Canberra, 15 ix 1961 (Strautmanis) 1♂ ANC. Canberra, 17–19 ii 1951 (Carne) 1♀ ANC. Canberra, 9 iv 1960 (Strautmanis) 1♂ ANC. Black Mt, 8 ii 1966 (Common) 1♀ ANC. Tidbinbilla SVa, 2 x 1950 (Key) 1♂ ANC.

REGULUS GROUP

Small crickets, with body length from 3–6 mm. Male tibia III with 4 inner and 3 or 4 outer subapical spurs; last inner subapical never thickened or bent as in Truncatus and Ornaticeps groups. Female tibia III with 3 inner and 3 outer subapical spurs (as in Nundra Group). Diagonal vein on male FW

strongly bent and mirror obsolete (Fig. 132HJKL). Cu₂ and 1A veins largely fused. Differs from Nundra Group mainly in leg coloration (dark brown in *P. nundra*) and in FW venation.

KEY TO SPECIES OF REGULUS GROUP

1. Femur III pale and with distinct dark blotches on outer face (Fig. 131F). Side of head pale but with brown band descending from eye to mandible (Fig. 131B) *gagooris*
- Femur III more or less unicolorous, not as in Fig. 132F. Side of head entirely brown or dark brown (Fig. 131A) 2
2. Cu₂ and 1A veins not fused or partially fused (Fig. 132MNO). Dorsum of head and pronotum often lighter than sides. Dorsum of body often with pale lateral bands on pronotum and FW's. Larger (Fig. 129B) *arima*
- Cu₂ and 1A veins largely fused (Fig. 132HJ). Dorsum of head and pronotum usually same color as sides and without lateral bands. Smaller (Fig. 129B) *regulus*

Pteronemobius regulus (Saussure), Figs. 127, 129BD, 130J, 132HJ

Nemobius regulus Saussure 1877: 87. Holotype ♀, Kimberley district, WA (Mjöberg) LM. Type lost. Neotype ♂ here designated, Roper Bar, NT, A-227, 4 x 1968, ANC.

Nemobius pulex Saussure 1877: 96. Holotype ♂, VM. Chopard 1951 synonym. Type examined.

Nemobius biguttatus Mjöberg 1913: 32. Holotype ♀, Noonkanbah, northwest Australia, SM. Chopard 1951 synonym. Type examined.

Pteronemobius parallelus Chopard 1925: 6. Holotype ♂, Cape York Peninsula, QLD (Mjöberg) SM. Chopard 1951 synonym. Type examined.

RANGE. Northern WA, NT, and QLD.

RECOGNITION. Males. Tiny species ca. 3.5 mm long. Body dark, shiny reddish-brown on dorsum and sides of body and pale on venter. File with 89–107 teeth (n=5). Pronotum unicolorous. Back of head not banded. Legs pale, but femur III with faint oblique stripes on outer face. Genitalia as in Fig. 130J. FW venation as in Fig. 132HJ. HW sometimes hidden and sometimes long, extending beyond ends of cerci. Dorsal surface of FW almost uniformly reddish-brown. Tibia III with 4 inner and 3 outer subapical spurs. First inner spur short and thick as in Truncatus Group, but last inner subapical spur not thickened and bent as in that group (Fig. 122C). Body length 3.5–4.5 mm.

Females: Similar to male. Tibia III with 3 inner

and 3 outer subapical spurs. Ovipositor 2.2–2.8 times as long as pronotum.

SONG. Fig. 128. Succession of short trills with duration of 0.25–0.4 s. Pulses increasingly louder during course of trill.

	p/s	tr/s	p/tr	kps	°C
A-227	107	2.4	ca. 29	9.9–10.1	29–31
A-162	96	1.5	26–31	8.8	27
A-130	100–108	1.1	35–42	7.1–7.4	27

HABITAT. Moist areas such as along streams and moist depressions.

SPECIMENS. Neotype ♂ ANC. A-14 1♀ ANC. A-23 1♂ ANSP. A-43 1♂ UM, 1♀ ANC. A-128 1♀ ANC. A-135 3♂ 2♀ ANC. A-139 1♀ ANC. A-163 1♂ ANC. A-227 1♂ ANC. WESTERN AUSTRALIA. 15.02S 126.55E, Drysdale R, Kimberley distr, 3–8 viii 1975 (Common, Upton) 1♀ ANC. 14.39S 126.57E, Drysdale R, Kimberley distr., 18–21 viii 1975 (Common, Upton) 1♂ 2♀ ANC. 16.35S 122.51E, 1 km S of Martins Well, W Kimberley distr, 26 iv 1977 (Colless) 1♀ ANC. 16.34S 122.51E, Martins Well, W Kimberley distr, 24 iv 1977 (Colless) 2♀ ANC. 15.49S 125.37E, Prince Regent River Reserve, 23 viii 1974 (Bailey, Richards) 1♀ ANC. Bev. Springs Statn., 11 viii 1974 (Bailey, Richards) 1♂ ANC. NORTHERN TERRITORY: Katherine, 18 viii 1973 (Kelsey) 1♂ 1♀ ANC. Waterfall Ck, 60 mi E of Pine Ck, 8 viii 1964 (Carne) 1♀ ANC. 14.13S 130.55E, 34 mi NW by W of Dorisvale HS, 14 viii 1968 (Mendum) 1♀ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 19 ii 1977 (Weir) 1♀ ANC. Howard Springs, 13 mi E of Darwin, 10 viii 1964 (Carne, Carne) 2♀ ANC. 16.39S 135.51E, McArthur River HS, 80 km SW of Borroloola, 13 v 1973 (Upton, Feehan) 1♂ 1♀ ANC. 12.17S 133.13E, 18 km E by N of Oenpelli, 1 vi 1973 (Key et al.) 1♀ ANC. 12.48S 132.42E, Nourlangie Ck, 8 km N of Mt Cahill, 21 v 1973 (Key et al.) 1♀ ANC. 12.46S 132.39E, 12 km NNW of Mt Cahill, 25 x 1972 (Key et al.) 1♂ ANC. Holmes Jungle, Palm Ck, 15 km NE of Darwin, 12 iii 1961 (Gressitt) 1♂ BISH. Arnhem Land, Maningrida, 16–20 iii 1961 (Gressitt) 3♂ 2♀ BISH. 16 mi W of Humpty Doo, 10 vi 1964 (Common) 1♀ ANC. Humpty Doo, 6 vi 1966 (Langfield) 9♂ 4♀ ANC. Darwin, 23 vi 1972 (Upton) 1♀ ANC. 8 mi ESE Katherine, 18 xii 1967 (Vestjens) 6♀ ANC. QUEENSLAND. Edge Hill, Cairns, 7 iii 1965 (Brooks) 12♂ 18♀ ANC. Edge Hill, Cairns, 24 iv 1965 (Brooks) 1♂ ANC. Homestead Silver Plains, E coast Cape York Pen, 22 iii 1960 (Wassell) 1♂ ANC. Cardstone, WNW of Tully, 14 ii 1966 (Hyde) 1♀ ANC. 2 mi W of Mission Beach, 18 iv 1969 (Common, Upton) 1♀ ANC. Bamboo Ck, nr Miallo, N of Mossman, 25 iv 1967 (Colless) 1♀ ANC. Cairns, 1917 (Illingworth) 2♂ BISH. Kuranda, 14 iii 1956 (Gressitt) 2♂ 1♀ BISH. Kuranda, 13 iii 1956 (Gressitt) 3♂ 4♀ BISH. Mareeba, Atherton Table'd, 10 iii 1956 (Gressitt) 1♀ BISH. Barron Falls nr Kuranda, 12 xii 1964 (Brooks) 1♀ ANC. Barron Falls nr Kuranda, 2 i 1965 (Brooks) 1♀ ANC. 1 mi N of Kuranda, 23 iv 1969 (Common, Upton) 1♂ 2♀ ANC. 2 mi ENE of Rollingstone, 26 iv 1969 (Common, Upton) 1♂ ANC. 20.20.5S 148.41E, Brandy Ck, 8 mi NE of Proserpine, 11 xii 1968 (Britton, Misko) 2♀ ANC. Bamaga, Cape York, 15–18 vi 1969 (Monteith) 1♀ UQC. Bamaga, Cape

York, 3–6 vi 1969 (Monteith) 1♂ 1♀ UQC. Ingham, 2 iii 1961 (Harley) 2♂ ANC. Ingham, 29 iii 1961 (Harley) 1♂ 2♀ ANC. Ingham, 7 iv 1961 (Harley) 1♀ ANC. Ingham, 27 iv 1961 (Harley) 1♂ 1♀ ANC. Lockerbie, Cape York, 6–10 vi 1969 (Monteith) 10♂ 16♀ UQC. Same data, 4♀ ANC.

Pteronemobius gagooris n. sp., Figs. 129A, 130K, 131BF, 132KL

RANGE. Northern WA, NT, and QLD.

RECOGNITION. Head pale brown to yellowish. Side of head with brown stripe descending from eye to base of mandible. Differs from *P. arima* in having patterned femur III (Fig. 131F). Pronotum pale on disk and dark brown lateral lobes. Lower half of body very pale. FW mostly brown but with pale stripe along wing angle and pale across end (becoming pale just behind anterior portion of mirror). File with 88–107 teeth ($n = 3$). HW's either hidden or extending beyond abdomen. Genitalia similar to *P. regulus* (Fig. 130K). Palpi very pale. Top of abdomen mostly brown to dark brown but with pale area medially. Tibia III with 4 inner and 3 outer subapical spurs. Inner ones very similar to *P. regulus*. Holotype measurements: File with 88 teeth. Pronotum 1.56 times as wide as long. FW 2.4 times as long as pronotum and 0.61 times as long as femur III. Femur III 1.39 times as long as tibia III. Latter 1.89 times as long as basitarsus III. Body length ca. 4 mm; femur III ca. 3.2 mm; cerci ca. 2.2 mm.

Females: Similar to males in color. Ovipositor 2.7–3.5 times as long as pronotum. HW's hidden beneath FW's or extending well beyond end of abdomen.

HOLOTYPE. ♂, A-286, 7.9 miles west of Gordonvale, QLD, 30 x 1968, ANC.

SONG. Fig. 128. Longish trills lasting from one to several seconds and with high pulse rate.

	p/s	kps	°C
A-286	120	9.3–10.0	24–27
A-26	118	9.0	44
A-24	112	8.3	24
A-298	103	7.6	18

HABITAT. Moist grassy areas.

SPECIMENS. Holotype ♂ ANC. A-767 1♀ ANC. A-780 1♂ ANSP. A-787 1♀ ANSP. A-252 1♂ UM. QUEENSLAND: Chillagoe, 8 viii 1967 (Ellis, Hawkins) 1♀ ANC. NORTHERN TERRITORY: 17.7 km SSW Mt. Sandford, 31 vii 1973 (Kelsey) 1♀ ANC. 16.47S 135.45E, McArthur R, 14 km SW Cape Crawford, 11 iv 1976 (Key, Balderson) 1♀ ANC. Katherine, 17 iv 1962 (Common) 1♂

ANC. WESTERN AUSTRALIA: Ivanhoe, 7 iv 1962 (Common) 1♂ ANC. 14.49S 126.49E, Carson Escarpment, Kimberley dist, 9–15 viii 1975 (Common, Upton) 2♀ ANC.

Pteronemobius arima n. sp., Figs. 129BC, 131A, 132UVW

RANGE. Northern NT and eastern periphery of QLD and NSW.

RECOGNITION. Males. Genitalia identical to *P. regulus* and *P. gagooris*. Small dark species with side of body very dark, almost black and top of head and pronotum often a little lighter. Differs from *P. gagooris* in lacking patterned hind femora, in having dark cheeks, and in having unfused or partially fused Cu₂ and 1A veins (Figs. 132MNO). Top of body sometimes with lighter band running along lateral margins of top surface; these begin along inner back margins of eyes and extend backwards onto FW's. Pale line on FW sometimes consists merely of pale vein along wing angle. Posterior margins of FW not pale as in *P. gagooris*. File with 77–101 teeth (n=4). Femur III brownish, without pronounced light and dark markings as in *P. gagooris*. Tibia III with 4 inner and 3 outer subapical spurs with top inner spur thickened. HW's either hidden or extending well beyond end of abdomen. End of last segment of maxillary palpi brown (pale in *P. gagooris*). Holotype measurements: File with 77 teeth. Pronotum 1.53 times as wide as long. FW 2.37 times as long as pronotum and 0.73 times as long as femur III. Body length ca. 4.7 mm; femur III ca. 3 mm; cerci ca. 2 mm.

Females: Similar to males in color. Ovipositor 2.3–2.9 times as long as pronotum.

HOLOTYPE. ♂, A-133, Howard Springs, near Darwin, NT, 25 ix 1968, ANC.

SONG. Not known.

HABITAT. Moist ground.

SPECIMENS. Holotype ♂ ANC. A-39 1♂ 1♀ ANC. A-227 1♀ ANC. NORTHERN TERRITORY: Holmes Jungle, Palm Creek, 15 km E Darwin, 13 iii 1961 (Gressitt) 2♀ BISH. 12.48S 132.42E, Nourlangie Ck, 8 km N Mt Cahill, 21 v 1973 (Key) 1♀ ANC. 12.25S 132.58E, 1 km N Cahills Crossing, East Alligator R, 29 v 1973 (Key) 1♀ ANC. QUEENSLAND: The Caves, 16 mi N Rockhampton, 3 iv 1967 (Upton) 2♀ ANC. Ingham, 2 iii 1961, 29 iii 1961, 7 iv 1961, 27 iv 1961 (Harley) 3♂ 4♀ ANC. Same data, 3 v 1961 (Straatman) 1♀ ANC. 26.00S 153.05E, Camp Milo, Coo-loodla National Park, 16–20 x 1978 (Rentz, Balderson) 10♂ 40♀ ANC. Mogill, near Brisbane, 27 ix 1958 (Gressit) 1♀ BISH. Edge Hill, Cairns, 24 iv 1965 (Brooks) 2♂ ANC. 18 mi S Gympie, 28 ii 1964 (Common, Upton) 2♀ ANC. Lake Eacham, 2 v 1955 (Norris, Common) 1♂ ANC. Eungella Nat. Park, 2400 ft, 2 iii 1964

(Common, Upton) 1♀ ANC. Cairns (Illingworth) 1♂ BISH. 10 mi W Collinsville, 12 ix 1950 (Riek) 1♀ ANC. NEW SOUTH WALES: Cabramatta, i, ii, iii, xi, xii, 1960–1965 (Nikitin) 7♂ 4♀ BM. Coraki, 10 xi 1961 (Common, Upton) 1♀. Bateman's Bay, 22 i 1963 (Common, Upton) 1♂ 7♀ ANC. A.C.T.: Canberra, 17 ii 1951 (Carne) 1♂ 2♀ ANC. Black Mt, 24 i and 3 ii (Common) 1♂ 1♀ ANC.

WARRAKARRA GROUP

This "group" includes only one known species. It has pale lateral lobes, an orange head and a FW with a pale lateral field. The genitalia are distinctive (Fig. 130E). Male and female tibia III with 4 inner and 3 outer subapical spurs; last inner spur in males not thickened or bent as in *Truncatus* or *Ornaticeps* groups. Cu₂ and 1A veins in males not largely fused and diagonal vein not strongly bent (Fig. 132Q).

Pteronemobius warrakarra n. sp., Figs. 130E, 131CDJ, 132Q

RANGE. Beaches in Darwin area.

RECOGNITION. Males: Body length 6–7 mm. Head orange. Genitalia as in Fig. 130E. Pronotum largely pale but with faintly darker markings mainly in posterior part and brown lower edge. File with 85–97 teeth (n=5). FW light brown on top and mostly pale on lateral field. Legs with faint darker markings; femur III patterned somewhat as in Fig. 131D. Abdomen dark reddish-brown on tergum, pale below. FW venation as in Fig. 131Q. Tibia III with 4 inner and 3 outer subapical spurs. First inner subapical spur short and conical. First outer apical spur shorter than last outer subapical spur. Holotype measurements: Pronotum 1.46 times as wide as long. FW 2.54 times as long as pronotum and 0.72 times as long as femur III. Femur III 1.35 times as long as tibia III. The latter is 2.00 times as long as basitarsus III. Body length 7 mm; femur III 4.2 mm; cerci ca. 3.5 mm.

Females: FW's shorter than combined length of head and pronotum but longer than pronotum. Similar to males in size and coloration, but top of abdomen highly variable in color—sometimes mostly pale, sometimes strongly mottled with brown. Each tergite with line of spots running parallel to hind margin. Ovipositor 1.93 times as long as pronotum. Tibia III with 4 inner and 3 outer subapical spurs.

HOLOTYPE. ♂, A-132, Casuarina Beach, east of Darwin, NT, 25 ix 1968, ANC.

SONG. May be succession of $\frac{1}{4}$ s chirps at 1.2/s at 27°C with pulse rate of 80–100 p/s.

HABITAT. Collected along beach.

SPECIMENS. Holotype ♂ ANC. A-132 3♂ 3♀ ANC, 1♂ ANSP. A-130 1♀ ANC.

TRIBE NEMOBIINI

BOBILLA n. gen.

TYPE SPECIES. *Bobilla bivittata* (Walker).

The members of this genus were formerly placed in the genus *Nemobius*. We have compared the genitalia of all of the species to the type species of *Nemobius* (*N. sylvestris* (Bosc.)—Fig. 136A) and consider them to be sufficiently distinct to place them in a new genus.

In Australia the members of this genus are restricted to the southernmost parts of the continent and Tasmania. They seem to be absent from the Nullarbor region. The genus is in need of detailed field work involving tape recording. The relation-

ships among disjunct populations in eastern and western Australia and among the islands of southern Australia and Tasmania will be especially interesting from the standpoint of species formation.

RECOGNITION. Maxillary palpi usually colored white and black with 4th segment entirely white or cream. Genitalia as in Fig. 136B–G. Both sexes with wings; HW often lacking. Side of body usually black; top of body pale brown or reddish-brown, or black centrally and pale laterally (Fig. 137AB). Top and back of head either with 3 central dark bands (Fig. 137ABC) or pale brown. In dark individuals head appears mainly dark with narrow pale stripes. Tibia III with 3 inner and 3 outer subapical spurs. FW venation as in Fig. 138. FW usually with several dark pigment spots and lateral field usually very dark or black, usually with narrow pale line running along wing angle. Top of abdomen black. Legs I and II blackish, but sometimes with larger pale spots on outer and upper faces. Femur III either black or with closely spaced oblique black stripes on outer face, occasionally mostly brown. Female ovipositor relatively long—usually about 3–4 times as long as pronotum.

TABLE 11. Comparison of *Bobilla* species.

	Known range	No. file teeth	5th segment of max. palpi all pale	Ovipositor length pronotal length
<i>plurampe</i>	NSW	350–400 n=4	yes	3.6–4.1 n=4
<i>killara</i>	NSW	87 n=1	yes	?
<i>bivittata</i>	WA	88–119 n=40	no	3.0–3.3* n=8
<i>neobivittata</i>	V, NSW	91–119 n=5	no	3.0–3.9 n=10
<i>victoriae</i>	V, NSW	150–210 n=26	no	4.0–4.7 n=11
<i>kindyerra</i>	SE Q	133–137 n=2	no	2.94 n=1
<i>poene</i>	T	150–170 n=3	no	3.44 n=1
<i>bakali</i>	T	99–109 n=2	no	3.50 n=1
<i>tasmani</i>	T, V	241–264 n=5	no	3.8–4.6 n=8

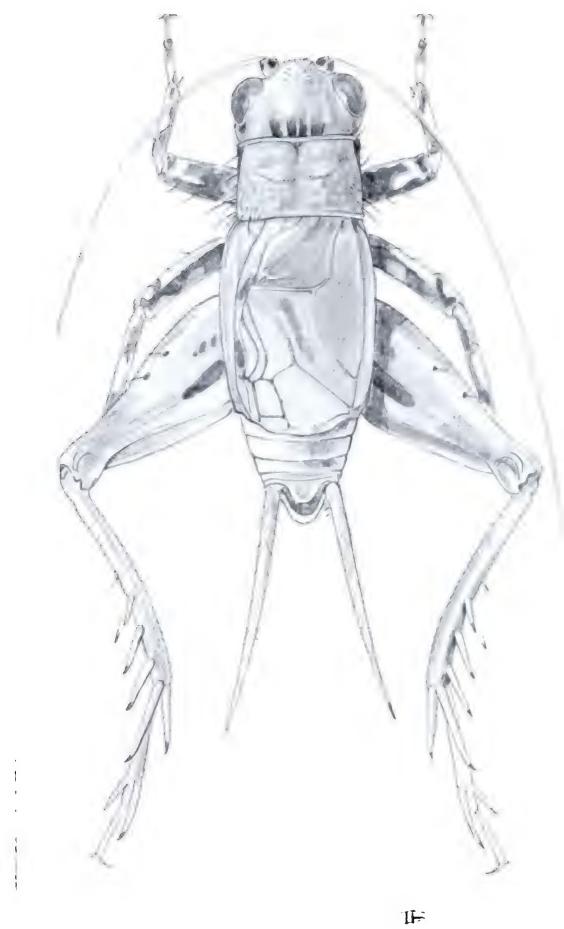
* See discussion of variation under this species.

KEY TO BOBILLA Males

- Segments 4 and 5 of maxillary palpi entirely white 2
- Segment 4 of maxillary palpi mostly pale, segment 5 partly or entirely dark 3
- Stridulatory file with 350–400 teeth. Genitalia similar to Fig. 136F *plurampe*
- Stridulatory file with fewer than 100 teeth. Genitalia more as in Fig. 136G *killara*
- File with 88–119 teeth 4
- File with more than 125 teeth 6
- Species from mainland Australia 5
- Species from Tasmania (see also song) *bakali*
- Pulse rate 50–60 pulses/second at 20–23°C. (Southwestern WA) *bivittata*
- Pulse rate 35–40 at 20–23°C. (Southeastern Australia) *neobivittata*
- File with 120–170 teeth 7
- File with more than 175 teeth 8
- File with 120–150 teeth. (VIC, NSW, QLD) *kindyerra*
- File with 140–160 teeth. (TAS) *poene*
- File with 180–210 teeth. (VIC, NSW, QLD) *victoriae*
- File with 230–270 teeth. (TAS, VIC) *tasmani*

PLURAMPE GROUP

The Plurampe Group includes two known species, *B. plurampe* and *B. killara*. The group is recognized by the entirely white 5th segment of the

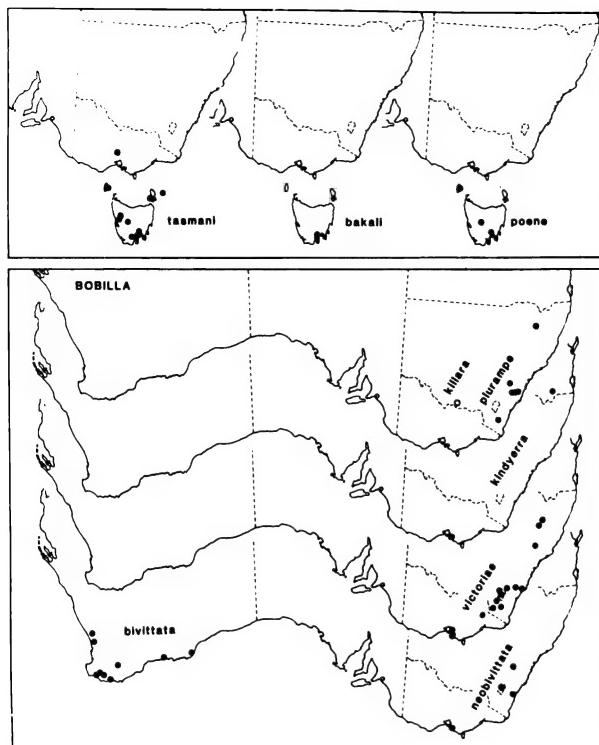
FIG. 133. *Bobilla victoriae*.

maxillary palpi. In the Bivittata Group the 5th segment is entirely or partly dark. The genitalia of the two species although not very similar to one another are distinct from the usual Bivittatus condition.

***Bobilla plurampe* n. sp., Figs. 136F, 137O, 138H**

RANGE. Great Dividing Range of NSW.

RECOGNITION. Males: Last two segments entirely pale yellowish or white (Fig. 137O). FW's relatively broad. File with 353–400 teeth ($n=4$). Genitalia as in Fig. 136F. All femora blackish but with few small pale spots on upper face. Outer face of femur III black, but lower ridge pale. Dorsum of head and pronotum dark brown; side of body black. Body length 8–9 mm; FW length 4–5 mm. Holotype mea-

FIG. 134. Distributions of *Bobilla* species.

surements: File with 392 teeth. Pronotum 1.65 times as wide as long. FW 2.76 times as long as pronotum and 0.76 times as long as femur III. Femur III 1.29 times as long as tibia III. Latter 2.29 times as long as basitarsus III. Body length ca. 9 mm; femur III ca. 6 mm.

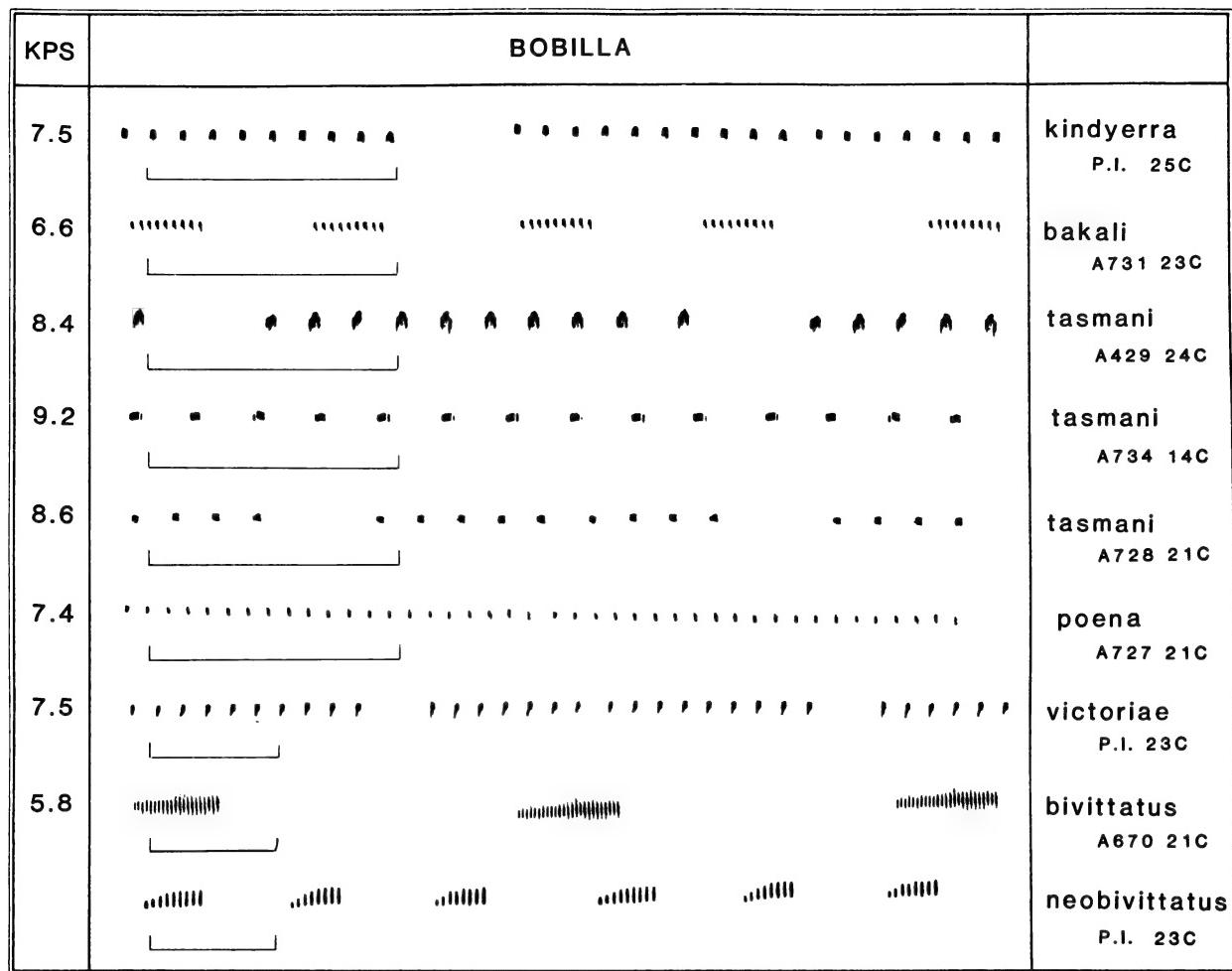
Females: Similar to males in color. FW length varies from shorter than pronotum to slightly longer. Ovipositor 3.6–4.1 times as long as pronotum. Body length 8–9 mm; femur III 4–5 mm.

HOLOTYPE. ♂, Wilson's Valley, 3 mi ESE of Island Bend, NSW, 26 iii 1967 (I. F. B. Common) ANC.

SONG. Unknown.

HABITAT. Mountain meadows.

SPECIMENS. Holotype ♂ ANC. NEW SOUTH WALES: Brown Mountain, 9 mi W Bemboka, 2 i 1960 (Key) 2♂ 1♀ ANC. Barrington Tops, 6–9 iv 1949 (Cane, Riek) 1♂ 1♀ ANC. Fitzroy Falls, 13 xi 1962 (Key, Chinnick) 1♂ 1♀ ANC. 34.41S 150.18E, 2 mi SW Bundanoon, 2000 ft, 27 ii 1969 (Britton, Upton, Misko) 1♀ ANC. Mount Dromedary, 1–2000 ft, 25 xi 1965 (Common, Upton) 1♂ 1♀ ANC. 34.24S 150.51E, Mount Keira summit, near Wollongong, 9 i 1973 (Key) 1♀ ANC. 6 mi N Moruya, 2 i 1962 (Key) 1♀

FIG. 135. *Bobilla* songs. P.I., Phillip Island, Victoria.

ANC. 34.38S 150.43E, Minnamurra Falls, near Kiama, 550 ft, 26 ii 1969 (Britton, Upton, Misko) 1♀ ANC.

Bobilla killara n. sp., Figs. 136G, 137K, 138F

RANGE. Type locality in southern NSW.

RECOGNITION. Males: Last two segments of maxillary palpi yellow-to-white as in *B. plurampe*. File with ca. 87 teeth ($n=1$). Genitalia as in Fig. 136G. FW venation as in Fig. 138F. Femora I and II mostly dark brown to black, but with small pale spots especially on upper face. Femur III marked as in Fig. 137K. Back of head with 3 distinct dark bands. Holotype measurements: Pronotum 1.46 times as wide as long. FW 1.93 times as long as pronotum and 0.56 times as long as femur III. Femur III 1.21 times as long as tibia III. Latter 2.96 times as long

as basitarsus III. Body length ca. 6.0 mm; femur III ca. 4.5 mm.

HOLOTYPE. ♂, Killara, NSW, 28 iv 1936 (M. F. Day) ANC.

SONG. Unknown.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC. The Australian gazetteer lists two Killara's in NSW. We have plotted the one near the Murray River. The other Killara is in the dry interior.

BIVITTATA GROUP

This group of six species differs from the Plurampe Group in the genitalia and in having the 5th segment of the maxillary palpi entirely or partially dark (Fig. 137). The members of this group cannot

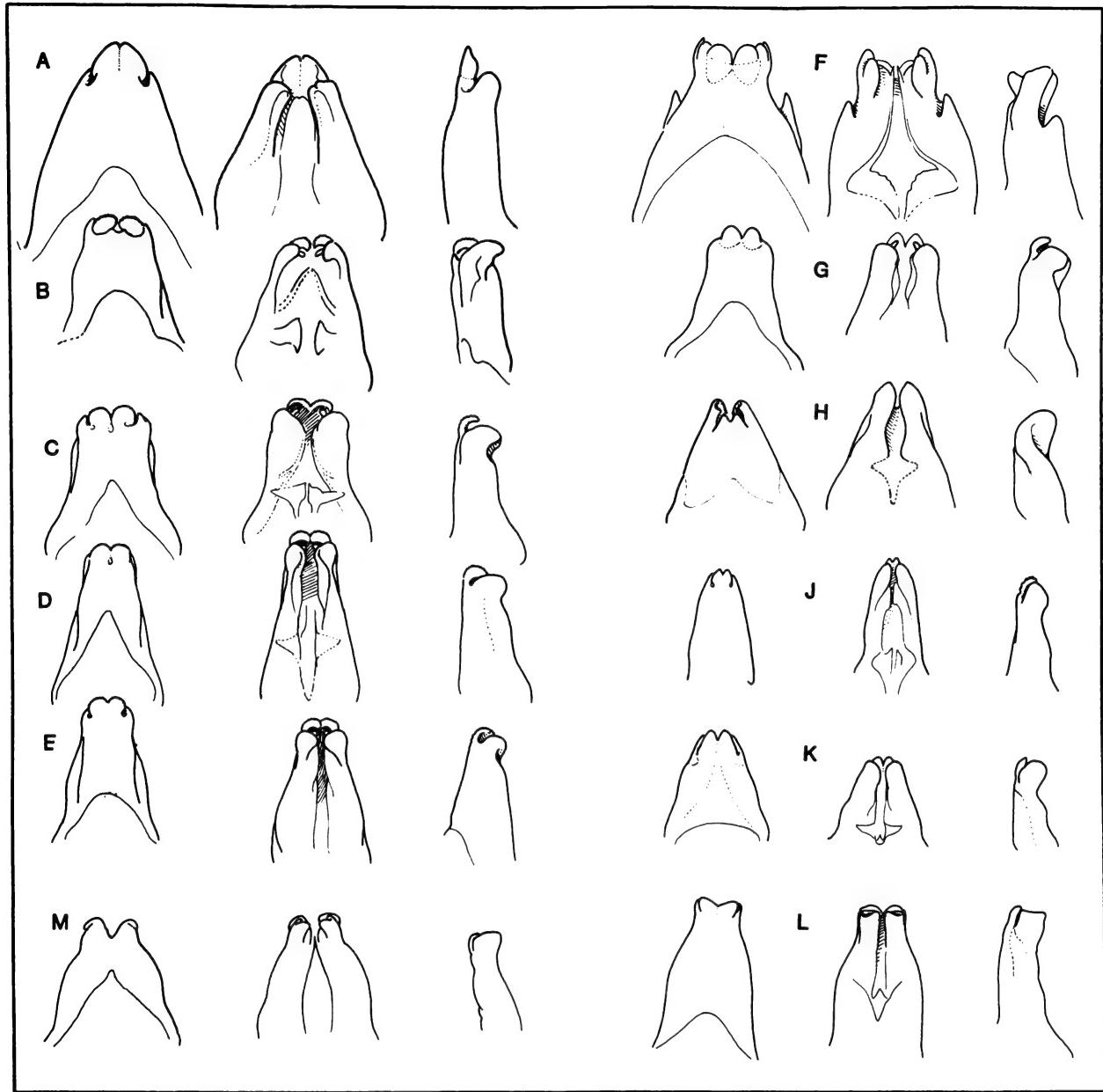


FIG. 136. *Nemobius*, *Bobilla*, *Tincanita*, *Silvinella*, *Nambungia* and *Specnia* male genitalia. A, *Nemobius sylvestris* (Portugal); B, *B. neobivittata*; C, *B. victoriae*; D, *B. poene*; E, *B. tasmani*; F, *B. plurampe*; G, *B. killara*; H, *Nambungia balyarta*; J, *Tincanita tewah*; K, *Silvinella wirraninna*; L, *Specnia grongrong*; M, *Specnia wirrega* holotype.

yet be clearly delineated because of the small numbers of individuals available for study and the lack of song records from over the entire range. In the absence of song the number of file teeth in the male and the ovipositor length in the female remain useful in identifying specimens.

Bobilla bivittata (Walker), Figs. 122E, 137B-ELN, 138A

Nemobius bivittatus Walker 1869: 59. Holotype ♂, Swan River, Perth, WA, BM. Type examined.

Nemobius australanus Mjöberg 1913: 32. Holotype ♀, Perth, WA, SM. Chopard 1951 synonym. Type examined.

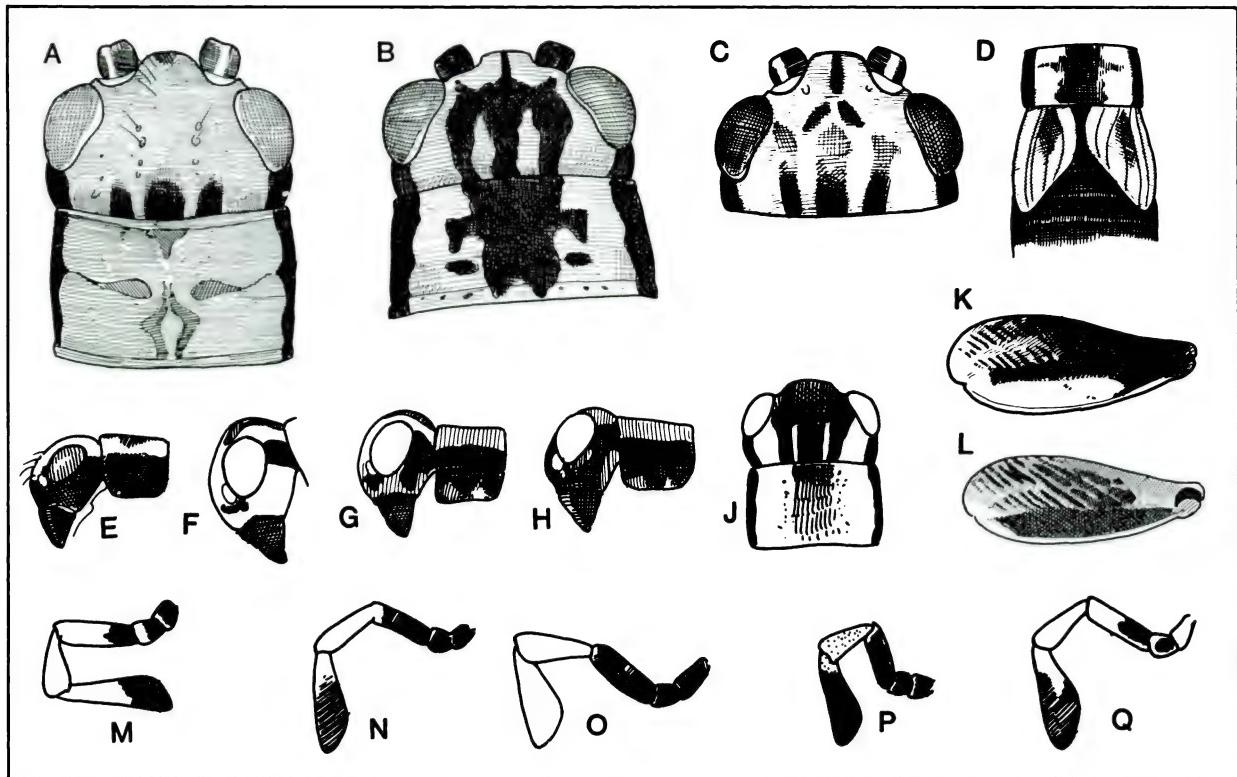


FIG. 137. *Bobilla*. A, *tasmani*; B, *bivittata*; C, *bivittata*; D, *bivittata* ♀; E, *bivittata*; F, *neobivittata*; H, *neobivittata*; J, *neobivittata*; K, *killara*; L, *bivittata*; M, *neobivittata*; N, *bivittata*; O, *plurampe*; P, *victoriae*; Q, *victoriae* (Canberra).

Nemobius femoratus Saussure 1877: 92. Holotype ♀, v.m. Chopard 1951 synonym. Type examined.

Nemobius annulipes Saussure 1877: 77. Holotype ♀, Australia (J. Verreaux) 2-47, PM. Type is badly damaged. Chopard 1951 synonym. Type examined.

RANGE. Extreme southwestern WA.

RECOGNITION. Males: Side and front of head usually black (very occasionally reddish on face). Face black below about middle of antennal sockets. Top of head usually with 3 dark bands centrally, and broad pale lateral bands (Fig. 137BC). File with 88-119 teeth. Sometimes 3 bands very indistinct or obsolete; sometimes fused on top of head. Palpi contrastingly marked; 4th segment always pale (Fig. 137) (this feature shared with other species). Lateral lobes of pronotum black; disk dark centrally and pale brown or cream laterally. Abdomen black on top and bottom and very pale on lateral membranous area. FW black on lateral field, largely transparent on dorsal field (but appearing black because of un-

derlying black abdomen) and with pale streak along wing angle. Femora I and II mostly black but with pale brown markings on upper face and at distal end. Tibiae I and II mostly dark but with pale region in middle. Basal tarsal segments dark at distal end. Femur III quite variable. Sometimes outer and upper faces almost entirely black but usually dark striped over most of outer face, very pale along bottom and brown on top (Fig. 137L). Tibia III with 3 inner and 3 outer subapical spurs (Fig. 122E); brown on spur side and black on opposite side. Cerci pale brown.

Females: Similar to males in color. FW's shorter than head plus pronotum, slightly overlapping medially and with hind dorsal margins forming strong V toward the pronotum. Ovipositor 2.94 times as long as pronotum. FW 1.31 times as long as pronotum.

SONG. Fig. 135. Rather widely spaced chirps with rapid pulse rate.

	p/s	ch/s	p/ch	kps	°C
A-670	55–60	0.63–0.89	22–25	5.7	20.5

HABITAT. Grassy areas, sometimes in grasses and under debris along ocean beaches.

SPECIMENS. Holotype ♂ BM. WESTERN AUSTRALIA: A-670 25+, ANC, 1♂ 2♀ UM. A-662 2♂ 1♀ ANC, 1♂ 2♀ ANSP. Nornalup, 20–23 i 1952 (Bornemissa) 1♂ ANC. Pemberton, 24 xi 1936 (Norris) 1♀ ANC. Mount Boyatup, 65 mi E Esperance, 23 iii 1968 (Common, Upton) 1♀ ANC. 8 mi SW Mt. Ragged, 23 iii 1968 (Common, Upton) 1♀ 1♂ ANC. Gnangara, 8 vi 1954, 1♀ ANC. Questionable identification: Pemberton, 24 xi 1936 (Norris) 1♀ ANC. Katanning, 29 v 1938 (Norris) 1♀ ANC.

Bobilla neobivittata n. sp., Figs. 136B, 137FHJM, 138DG

RANGE. Eastern VIC to southeastern NSW.

RECOGNITION. Males: Morphologically very similar to *B. bivittata* from Western Australia. Occiput with 3 clearly defined dark bands around center; anteriorly these may coalesce on vertex. Pronotal disk usually darker medially and pale along margins. Central dark area may be black and broad or brownish and narrower. Side of head may be entirely black in dark individuals, or brownish and with black area behind the eyes in lighter individuals. File with 91–119 teeth (n=5) (see Variation). Outer face of femur III either with distinct oblique stripes (in lighter individuals) or almost entirely dark brown to black. Femur I marked with light and dark areas in lighter individuals, black in dark individuals. Dorsum of abdomen black. Venter of abdomen black and with pale median band in darker individuals, and mostly brownish in lighter individuals. Genitalia as in *B. bivittata*. Body length 7–8 mm. Femur III length 4–5 mm.

Females: Similar in coloration to males. FW's usually slightly longer than pronotum and shaped as in *B. bivittata* (Fig. 137D). Ovipositor 3.0–3.8 times as long as pronotum (see Variation).

VARIATION. The stridulatory file in males varies as follows: Phillip Island, VIC (115, 116, 119 teeth), Broulee, NSW (91, 104 teeth). Female ovipositors are slightly longer at Broulee, NSW, than elsewhere. The ratio of ovipositor length to pronotal lengths varied as follows: Phillip Island, VIC (3.2); Canberra (3.2); Tuglow, NSW (3.0), Clyde Mt, NSW (3.4), Broulee, NSW (3.3, 3.7, 3.9, 3.9, 3.9).

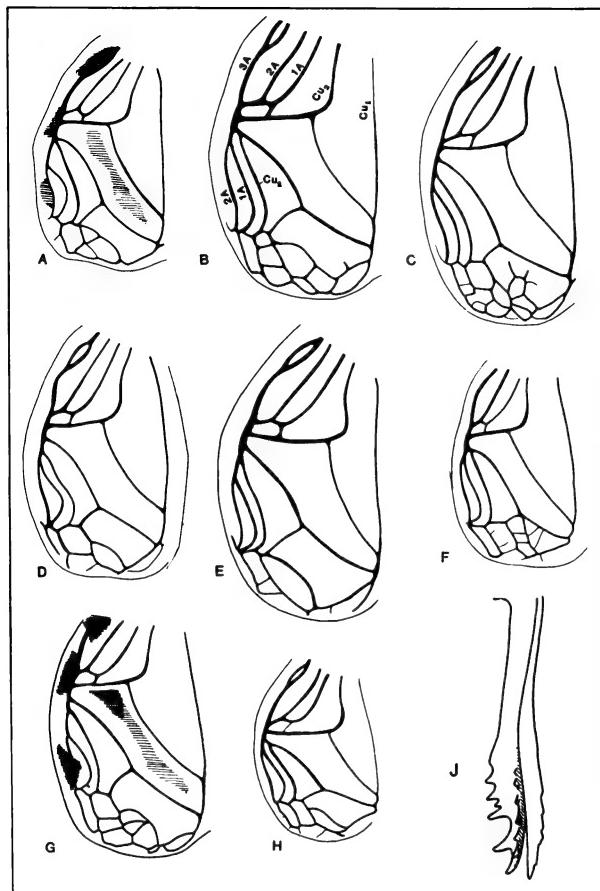


FIG. 138. A–H, *Bobilla* right FW, dorsal field: A, *bivittata*; B, *victoriae*; C, *poene*; D, *neobivittata*; E, *tasmani*; F, *killara*; G, *neobivittata* Broulee NSW; H, *plurampe*. J, ovipositor of *Narella tintinara*.

HOLOTYPE. ♂, Phillip Island, VIC, 21 ix 1979 (A. Evans) ANC.

SONG. Fig. 135. At Phillip Island, a succession of 8–9 pulse chirps with pulse rate of about 37.5/s at 22.5°C. Songs of more northern populations not known, therefore taxonomic status very much in doubt.

HABITAT. Open grassy areas.

SPECIMENS. Holotype ♂ ANC. A-318 2♂ 1♀ ANC. NEW SOUTH WALES: 33.56S 149.56E, Tuglow Station, 16 mi SE Oberon, 7 iv 1969 (Key) 1♀ ANC. Canberra, A.C.T., Black Mt., 10 ix 1962 (Strautmanis) 1♀ ANC. Clyde Mountain, 2400 ft, 29 ii 1968 (Upton) 1♀ ANC. Broulee, 18 iii 1978 (Rentz) 3♂ 8♀ ANC.

Bobilla bakali n. sp.

RANGE. Type locality in TAS.

RECOGNITION. Males: Morphologically almost indistinguishable from *B. bivittata*, but differing in song. Known only from Tasmania and so not likely to be confused with *B. bivittata*. File with 99–109 teeth (n=2). Genitalia similar to *B. bivittata*. Holotype measurements: File with 99 teeth. Pronotum 1.64 times as wide as long. FW 3.0 times as long as pronotum. Femur III 1.20 times as long as tibia III. Latter 2.88 times as long as basitarsus III. Body length ca. 8 mm; femur III length ca. 5 mm; cercal length ca. 3 mm.

Females: Similar to male in color and size. Ovipositor 3–5 times as long as pronotum.

HOLOTYPE. ♂, A-731, Hobart, TAS, 4 iv 1969, ANC.

SONG. Fig. 135. Song recorded has 9–13 pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-731	60	2.7	9–13	6.6	23

HABITAT. Open moist grassy areas.

SPECIMENS. Holotype ♂. A-731 1♂ ANC.

Bobilla poene n. sp., Figs. 136D, 138C

RANGE. TAS and Bass Strait islands.

RECOGNITION. Males: Very similar to *B. bakali* but with slower song and with 150–156 file teeth (n=2). On the basis of only 2 males and 1 female this species appears to differ in amount of blackness—the pale bands on disk of pronotum not nearly so wide, tops and distal ends of femora I and II largely black, and outer face of femur I largely blackish and less strikingly banded. Abdomen blackish on ventral surface but with pale median band running length of abdomen. Holotype measurements: Pronotum 1.67 times as wide as long. FW 2.78 times as long as pronotum. Femur III 1.16 times as long as tibia III. Latter 2.69 times as long as basitarsus III. Body length 7.2 mm; femur III length ca. 5.0 mm; cercal length ca. 3.0 mm.

Females: Similar in color to males. Ovipositor about 3.4 times as long as pronotum (similar to *B. bakali*). FW black except for pale stripe along wing angle. FW ca. 1.5 times as long as pronotum. Body length ca. 7.5 mm; femur III ca. 5.0 mm; cerci ca. 3.0 mm. Females of *B. poene* and *B. bakali* largely indistinguishable when not associated with males.

HOLOTYPE. ♂, A-734, Bronte Park, TAS, 5 iv 1969, ANC.

SONG. Fig. 135. Slow, short trills containing 15–25 pulses.

	p/s	p/tr	kps	°C
A-734	14.4	15	6.8	13
A-727	24.8	ca. 25	7.4	21

HABITAT. Grassy meadows.

SPECIMENS. Holotype ♂ ANC. Same data, 1♂ 1♀ ANC. 9 mi NW Naracoopa, King Island, TAS, 9 iii 1969 (Key) 1♂ ANC.

Bobilla tasmani n. sp., Figs. 136E, 137A, 138E

RANGE. TAS, Bass Strait Islands and southern VIC.

RECOGNITION. Males: Very similar to *B. bakali* and *B. poene*, but file with 241–264 teeth (n=5). Dorsum of head and pronotum usually with less dark pigmentation than in above two species (Fig. 137A) and reddish or orange in color, but sometimes clearly banded as in *B. bivittata* (Fig. 137B). One male from Armidale, NSW, mostly black but not banded and may belong to different species. Femur III variable, sometimes almost entirely orange-brown on outer face, sometimes mostly black. Top of abdomen in females varying from black to banded. In banded female top of abdomen mostly brown with median black band and several longitudinal rows of spots laterally. Bottom of abdomen usually black on sides of sternum and pale brown to cream medially. Ovipositor about 4.06 times as long as pronotum. Lateral field of FW varying from light brown to black. Body length ca. 7.0 mm. Femur III ca. 5 mm. Holotype measurements: File with 241 teeth. Pronotum 1.7 times as wide as long. FW 2.50 times as long as pronotum. Femur III 1.27 times as long as tibia III. Latter 2.56 times as long as basitarsus III. Body length ca. 7.7 mm; femur III ca. 4.9 mm; cerci ca. 3.0 mm.

FEMALES: Similar in color and size to males. Ovipositor distinctly longer than in *B. poene* and *B. bakali* (Table 11).

HOLOTYPE. ♂, A-429, 2.5 miles southeast of Gisborne, 11 ii 1969, ANC.

SONG. Fig. 135. Slow trill often produced in daytime with irregularly occurring momentary breaks.

	p/s	kps	°C
A-734	8.0	9.2	13
A-429	11.3	8.4	24
A-727	11.4–12.5	8.0–9.4	21
A-728	12.4	8.6	21

HABITAT. Meadows, ditches, and other grassy places.

SPECIMENS. Holotype ♂ ANC. A-734, 1♂ ANC. A-730 2♂ 1♀ ANC. A-729 1♂ ANSP. TASMANIA: Glen Iris, King Island, 12 ii 1953 (Tindale) SAM. 40.03S 144.02E 2 mi W Grassy, King Isl, 8 iii 1969 (Key) 1♀ ANC. 39.57S 143.52E, 1 mi S Currie, King Isl, 10 iii 1969 (Key) 1♀ ANC. The Settlement, Cape Barren Isl, 11 iii 1952 (Calaby) 1♀ ANC. Remine, near Zeehan, 29 i 1948 (Key, Carne, Kerr) 1♂ ANC. 7 mi W Roseberry, 19 ii 1963 (Common, Upton) 1♂ 4♀ 4♂ ANC.

Bobilla victoriae n. sp., Figs. 133, 136C, 137PQ, 138B

RANGE. Great Dividing Range of NSW and VIC.

RECOGNITION. Males: Genitalia similar to *B. bivittata*. Differing from all other species mainly in number of file teeth: 150–210 (n=26). Top of head and pronotum usually reddish-brown. Back of head usually with longitudinal dark bands, but obscure in some individuals (as in *B. kindyerra*). Side of body black. Femur III mostly covered with regular dark striations on outer face. FW venation as in Fig. 138B. Fourth segment of maxillary palpi reddish-brown, 5th segment mostly black. Body length 7–8 mm; femur III 4.5–5.5 mm. Holotype with 202 teeth.

Females: Body length ca. 9.0 mm; femur III ca. 6.2 mm. Ovipositor ca. 1.14 times as long as femur III and ca. 3.7 times as long as pronotum; FW ca. 1.40 times as long as pronotum.

VARIATION. A macropterous male from Phillip Island, VIC, has the HW's extending well beyond the cerci; the dorsum of the head is largely black, but 3 bands are visible on the occiput; the dorsum of the pronotum is almost entirely black but has paler areas at the 4 corners of the disk; the outer faces of femora III are black but the lower front corners are pale; the venter of the abdomen is black but has a median pale band. Files vary as follows: A.C.T. (155, 158, 162, 170, 170, 178, 179, 187, 187, 193, 197), Barrington Tops, NSW (153, 170, 203); Kosciusko N.P. (150, 171, 175, 192, 193, 200, 210), Baxter, VIC (182, 192), Cooma, NSW (188).

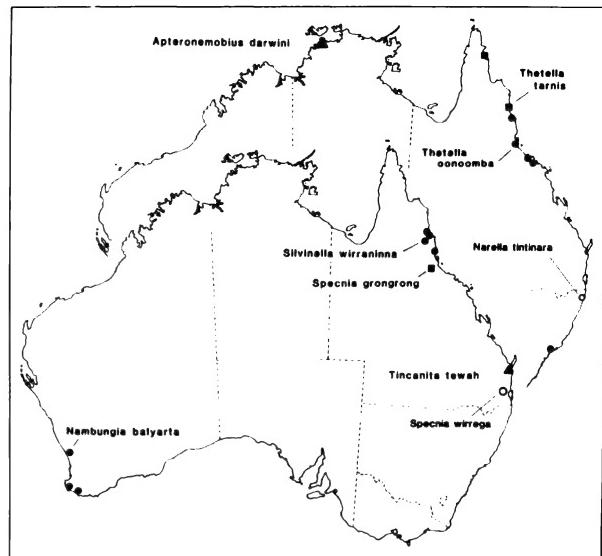


FIG. 139. Distributions of various Nemobiinae.

HOLOTYPE. ♂, Phillip Island, VIC, 21 ix 1979 (A. Evans) ANC.

SONG. Fig. 135. Short trills with pulse rate of 10 p/s at 22.5°C.

HABITAT. Open grassy areas.

SPECIMENS. Holotype ♂ ANC. ACT: Canberra, 10 ii 1961 to 28 iii 1960 (Strautmanis) 31♂ 32♀ ANC. GININDERRA FALLS, 28 ii 1961 (Colless) 1♀ ANC. Mt Coree, 2 x 1961 (Colless) 1♀ ANC. Canberra, 12 ii 1951 (Carne) 1♀ ANC. Canberra, 14 iii 1969 (Balderson) 2♂ 1♀ ANC. 36.21S 148.25E, Guthega Power Station, Kosciusko Nat Pk, 1400 m, 20 iii 1979 (Rentz) 9♂ 11♀ ANC. 2 mi N Uriarra Homestead, ACT, 8 ii 1950 (Key) 4♂ 4♀ ANC. NEW SOUTH WALES: Barrington Tops, 6 iv 1949 (Cane, Rick) 2♂ 4♀ ANC. 1 mi SW Mt. Gungarten, 27 i 1962 (Key Lake) 1♂ ANC. 35.03S 150.16E, 15 km W Tomerong, 18 ix 1977 (Rentz) 1♂ ANC. Charlotte's Pass, Kosciusko Massif, 6500 ft, 8 ii 1968 (Upton, Mound) 1♀ ANC. Currarong to Beecroft Head 1 i 1967 (Key) 1♀ ANC. Illawong, Lake Eucumbene 18 ii 1968 (Key) 1♀ ANC. Lake George, 5 mi NW Bungendore, 12 iii 1961 (Key) 1♀ ANC. 10–13 mi N Guyra, iii 1941 (Key) 1♀ ANC. 3 mi WNW Cooma 18 iv 1961 (Chinnick) 1♂ ANC. Armidale, 24 xi 1977 (Davidson) 2♂ 2♀ ANC. VICTORIA: 3 mi NW Cobungra, W of Omeo, 30 iii 1967 (Key) 6♀ ANC. Baxter, 12 iii 1966 (Grant) 2♂ 1♀ BM. Phillip Island, 21 ix 1979 (Evans) 1♂ ANC.

Bobilla kindyerra n. sp.

RANGE. Phillip Island, VIC, and Emu Vale, QLD. Song of QLD specimens not known, but file counts similar.

RECOGNITION. Males: Similar to *B. victoriae*. Micropterous. File with 133 (holotype) and 137

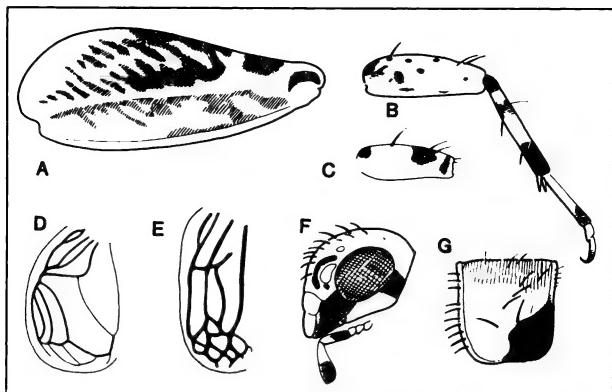


FIG. 140. A, *Specnia grongrong* femur III; B, *Nambungia balyarta* outer leg II; C, *Silvinella wirraninna* outer femur I; D, *Specnia grongrong* FW; E, *Tincanita tewah* FW; F, *Nambungia balyarta* head; G, *Specnia grongrong* lateral lobe.

teeth. Genitalia similar to *B. victoriae* and *B. bivittata*. Top of head reddish, without strongly defined dark bands; traces of dark bands occur on occiput on some individuals. Dorsum of pronotum largely reddish-brown, somewhat spotted and usually without strong median band. Body length ca. 7.0 mm. Femur III ca. 4 mm.

Females: Female from Emu Vale, QLD, darker on top of body but still lighter than on side of body. Ovipositor 3.06 times as long as pronotum. FW 1.47 times as long as pronotum.

HOLOTYPE. ♂, Phillip Island, VIC, 21 x 1979 (A. Evans) ANC.

SONG. Fig. 135.

HABITAT. Moist grassy depressions.

SPECIMENS. Holotype ♂ ANC. Bald Mountain area, 3–4000 ft via Emu Vale, QLD, 22 i 1971 (Cantrell) 1♂ 1♀ UQ.

SPECNIA n. gen.

TYPE SPECIES. *Specnia grongrong* n. sp.

This genus is named after Mt. Spec where it first was found. It appears to be related to the other forest genus, *Silvinella*, which has both sexes wingless but which lives in similar habitats in northern QLD. The genus was found in leaf litter in a rain forest west of Mount Spec near Paluma. It is also known from rain forests of southeast QLD.

RECOGNITION. Females wingless. Males with well-developed FW's and without HW's. Both

sexes with outer tympana only. Both sexes with 3 inner and 3 outer subapical spurs on tibia III. Outer spurs not very long. Femur III with distinct oblique brown markings which coalesce in places (Fig. 140A) (some members of *Pteronemobius* have similar markings). Head slightly wider than pronotum. Pronotum not wider in rear than front.

Specnia grongrong n. sp., Figs. 136L, 140ADG

RANGE. Mt Spec region of coastal QLD.

RECOGNITION. Males: Tibia III with 3 inner and 3 outer subapical spurs in both sexes. Lateral lobe of pronotum black in lower posterior portion (Fig. 140G). Head slightly wider than pronotum and entirely reddish except for eyes. Femur III strongly mottled (Fig. 140A). Tibia III dark reddish-brown. Male FW wide, especially dark around proximal portions of stridulatory vein and veins 1A and 2A nearly transparent (or at least pale). File with 112 teeth ($n=1$). Genitalia as in Fig. 136L. Head 1.02 times as wide as pronotum. Pronotum not widening posteriorly and 1.67 times as wide as long. FW 2.96 times as long as pronotum and 1.40 times as long as wide. FW 0.89 times as long as femur III. Femur III 1.45 times as long as tibia III. Latter 1.94 times as long as basitarsus III. Body length ca. 7.1 mm; femur III ca. 4.0 mm; cerci ca. 2.5 mm.

Females: Wingless. In color very similar to male but top of abdomen with prominent row of dark spots on each segment. These also in rows along length of abdomen. Ovipositor about 0.62 times as long as femur III and 1.76 times as long as pronotum.

HOLOTYPE. ♂, A-275, 10.1 miles east of Running River, west of Paluma, near Mt. Spec, QLD, 22 x 1968, ANC.

SONG. Short chirp, believed to have 3 pulses, may represent song but no tape obtained.

HABITAT. Leaf litter in rain forest.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♀ ANC. Mt Spec, via Paluma 21 iv 1968 (Cantrell) 1♀ UQC.

Specnia wirrega n. sp., Fig. 136M

RANGE. Mary Cairncross Park and Conondale area, north of Brisbane, QLD.

RECOGNITION. Males: FW venation similar to *S. grongrong*, but file with 132 teeth. Genitalia as in Fig. 136M. Lateral lobe of pronotum entirely black, disk pale brown. Face reddish. Maxillary palpi

white. Femur III not strongly mottled. FW 2.75 times as long as pronotum. Body length ca. 5.2 mm; femur III ca. 4.0 mm; cerci ca. 3 mm.

Females: Black on side of pronotum and abdominal tergites. Femur III with strong dark brown striations. Palpi white. Ovipositor 0.83–0.85 times as long as femur III and 1.94–2.33 times as long as pronotum.

HOLOTYPE. ♂, Rainforest Pitfall 1B, Mary Cairncross Park, via Maleny, SE QLD, 1974–1975, 488 m (G. B. and S. R. Monteith) QM.

SONG. Not known.

HABITAT. All three specimens collected in rainforest pitfall traps.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 1♀ QM. Rainforest Pitfall 13B, Bouloumba Creek, via Conondale, SE QLD, 1974–1975, 550 m (Monteith) 1♀ QM.

TINCANITA n. gen.

TYPE SPECIES. *Tincanita tewah* n. sp.

This genus is intermediate between *Specnia* and *Silvinella* in respect to the development of structures involved in acoustical communication. The genus is represented by a single male from Tin Can Bay, QLD. The habitat is not known but it is presumed to be a forest leaf litter species.

RECOGNITION. Male FW's with rudimentary stridulatory file and without any traces of stridulatory teeth. Tibiae I without auditory tympana. Genitalia somewhat similar to *Silvinella*. Tibia III with 3 inner and 3 outer subapical spurs and with 3 inner and 3 outer apical spurs. (See species description for additional information.)

***Tincanita tewah* n. sp., Figs. 136J, 140E, 141**

RANGE. Type locality at Tin Can Bay, southeast QLD.

RECOGNITION. Males: FW's without stridulatory file; rather strongly sclerotized. Tympana absent. Tibiae III with 3 inner and 3 outer subapical spurs (Figs. 122F). Genitalia as in Fig. 136J. Face mostly reddish-brown below median ocellus. Clypeus mostly black. Maxillary palpi white in distal $2\frac{1}{2}$ segments; dark brown to black in proximal $2\frac{1}{2}$ segments. Top of head grey brown and with 5 broad darker bands (comprised of closely spaced darker

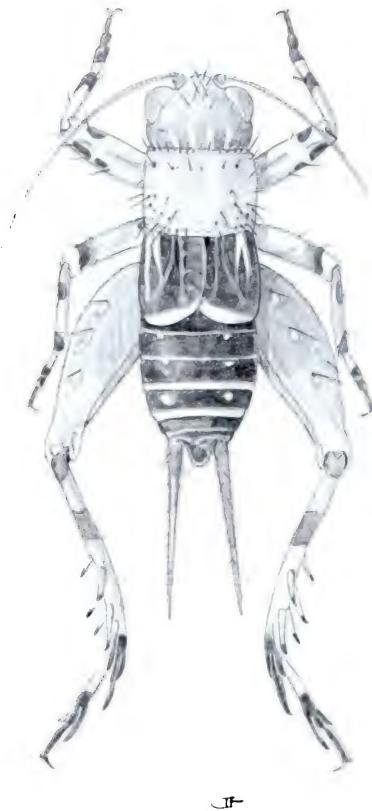


FIG. 141. *Tincanita tewah* male.

spots) separated by 4 narrow pale tan to milky stripes. Lateral lobes of pronotum darker than disk, and darkest in posterior half. Disk pale brown to ivory, lighter along lateral margins, and with numerous black bristles. FW dark brown to black on lateral field, and grey brown over most of dorsal field. Veins near lateral margin of dorsal field and posterior margin ivory colored. Abdomen mostly black above but last 4 tergites with pale posterior margins and first 3 tergites behind FW's with two pale spots, one on either side of median line. Femora I and II pale but with prominent brown markings on upper and distal parts. Tibiae I and II with 3 dark bands, 2 in first half and one in second half. Basitarsus I and II pale in first two-thirds, black in distal one third. Head 1.11 times as wide as pronotum. Pronotum 1.17 times as wide as long. FW 1.07 times as long as pronotum and 0.32 times as long as femur III. Femur III 1.16 times as long as tibia III. Latter 3.54 times as long as basitarsus III. Body

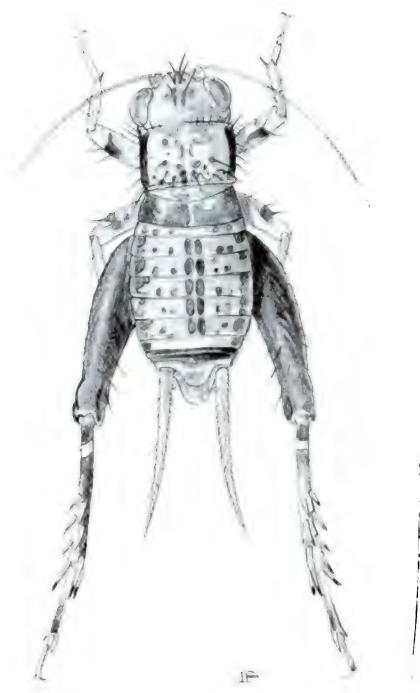


FIG. 142. *Silvinella wirraninna* male.

length ca. 6.0 mm; femur III ca. 4.5 mm; cerci ca. 4 mm.

HOLOTYPE. ♂, Tewah Creek, via Tin Can Bay, QLD, 17–18 x 1970 (G. B. Monteith) UQC.

SONG. Although possessing rudiments of stridulatory vein, lacks teeth. Also lacks auditory tympana.

SPECIMENS. Holotype ♂ UQC.

SILVINELLA n. gen.

TYPE SPECIES. *Silvinella wirraninna* n. sp.

The two known members of this wingless genus of tiny brown spotted crickets have been found only in surface litter and leaf trash on the forest floor in dense rain forests. Most often they were in localized colonies. In the daytime individuals exposed by scratching surface litter are so quick and well camouflaged as to defy capture, partly because immediately following their short leaps they dig quickly down into the litter and remain motionless until

severely disturbed again. Presumably this behavior was related to the presence of ground-foraging birds, which had obviously worked considerably in all the areas where we found these crickets. Their behavior is quite different at night, when they are often seen walking about or motionless on top of the litter, and can easily be captured by placing inverted vials over them and forcing a bit of the litter into the vial as it is lifted. As with nearly all surface and subterranean crickets, they cannot climb vertical glass surfaces.

RECOGNITION. Both sexes wingless. Auditory tympana absent. Tibia III with 3 inner and 3 outer subapical spurs and 3 inner and 3 outer apical spurs; inner spurs without long fringes of hairs as in *Apertonemobius*. Body length 5–6 mm. Female ovipositor 1.4 to 2.2 times as long as pronotum. Head slightly wider than pronotum.

Silvinella wirraninna n. sp., Figs. 136K, 140C, 142

RANGE. Coastal forests of QLD between Townsville and Cairns.

RECOGNITION. Both sexes wingless. Top of body mainly pale brown and with dark spots. Side of body with dark band running entire length from front of lateral lobes to end of abdomen. This band blackish on the lateral lobes. Top of head rather orange but with dark marking in vicinity of ocelli. Face dark reddish-brown but lower lobe of clypeus and labrum pale. Basal antennal segments pale. Tibia III with 3 inner and 3 outer subapical spurs. Femora I and II mostly pale brown, but with large dorsal brown marks in distal half (Fig. 140C). Femur III with rows of oblique stripes on outer and upper faces. Upper margin of dark band on abdomen indefinite and giving way above to spots. Thoracic area immediately behind pronotum sometimes blackish. Female very similar to male in size and coloration. Ovipositor of a female from A-27 is 2.16 times as long as the pronotum and 0.66 times as long as femur III. Head 1.1 times as wide as pronotum. Width of pronotum 1.46 times as great as length. Femur III 1.54 times as long as pronotum and 1.37 times as long as tibia III. Latter 2.08 times as long as basitarsus III. Body length ca. 6 mm; femur III length ca. 3.5 mm.

HOLOTYPE. ♂, A-49, rain forest just north of Tolga, near Atherton, QLD, 14 viii 1968, ANC.

HABITAT. Found among leaves and forest floor

litter in rain forests; cryptically colored and very difficult to capture because disturbed individuals leaped several times then crawled quickly under debris.

SPECIMENS. Holotype ♂ ANC. A-24 1♂, ANC, 1♂ 3♀ ANSP. A-27 1♀ UM. A-29 1♀ ANC. A-33 3♀ ANC. A-49 3♂ 3♀ ANC, 1♂ UM. A-275 1♂ ANC.

Silvinella heteropus (Walker)

Nemobius heteropus Walker 1869, i: 60 Holotype ♀, Australia, BM. Type bears the following labels: "Type of *Nemobius heteropus*; *N. heteropus*, one of Walker's series so-named; 58.24; Australia." Type examined.

RANGE. Not known. Only specimen, the type, listed from "Australia."

RECOGNITION. Holotype is dark smoky-colored, apterous specimen with 3 nonapical spurs on each margin of tibia III. Femur III diagonally barred on dorsal half of proximal third, otherwise dark brown with ventral $\frac{2}{5}$ yellowish with large dark marks. Tibiae III brownish, banded with yellow; ovipositor dark brown; femora I, II, blackish. Apical 2 segments of maxillary palpi yellowish, slightly speckled with brown, proximal segments blackish. Face shiny black, eyes yellowish-gray dorsally, blackish-gray ventrally; dorsal head and pronotum yellowish-gray. Body measurements (mm): length of body 7.0; femur III, 2.56; ovipositor, 2.28; pronotum, 1.63; head, 1.09; basitarsus III, 0.36; head width, 2.1; anterior pronotum, 1.94; posterior pronotum, 2.18; rostrum, 0.43.

HABITAT. Not known. Probably rainforest litter.

SPECIMENS. Holotype ♀ BM.

NAMBUNGIA n. gen.

TYPE SPECIES. *Nambungia balyarta* n. sp.

The origin of this genus is quite obscure. It seems to belong to the *Bobilla* Genus Group on the basis of the hind tibial spurs and body coloration. Its genitalia are distinctive however. We speculate that the genus is derived from a *Bobilla*-like species which dispensed with acoustical communication and subsequently also lost its wings.

RECOGNITION. Both sexes without wings and without tympana. Dorsum of body lighter than sides; latter blackish. Face with dark band descend-

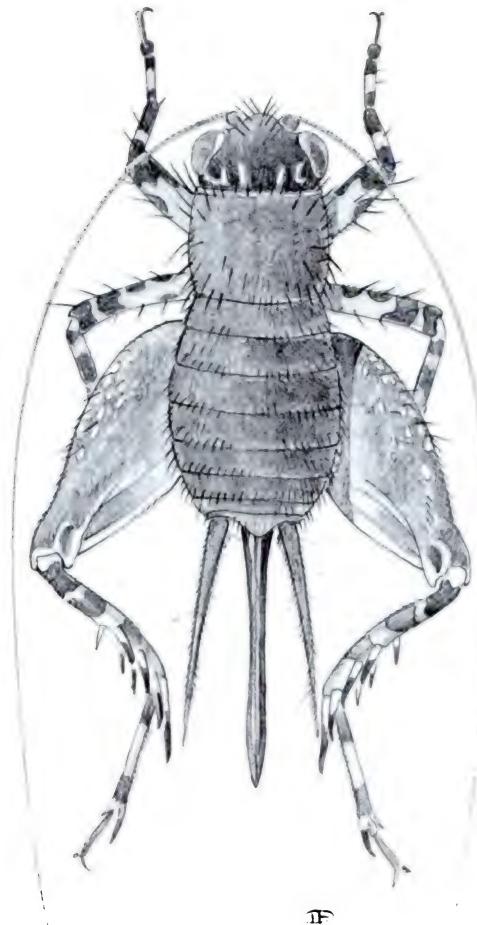


FIG. 143. *Nambungia balyarta* female (male similar).

ing from eyes onto mandibles. Male genitalia as in Fig. 136H. Legs spotted (Fig. 140B). Tibia III with 3 inner and 3 outer subapical spurs and 3 inner and 3 outer apical spurs.

***Nambungia balyarta* n. sp., Figs. 136H, 140BF, 143**

RANGE. Extreme southwestern WA.

RECOGNITION. Males: Wingless and without auditory tympana. Genitalia as in Fig. 136H. Top of body reddish-brown from front of head to abdomen; abdomen mostly black and with two rows of pale spots, one row on either side of abdomen (Fig. 143). Top of head faintly banded. Side of body with strong black band running from back of eye backwards onto abdomen. Side of head with broad dark band descending onto mandible from bottom of eye.

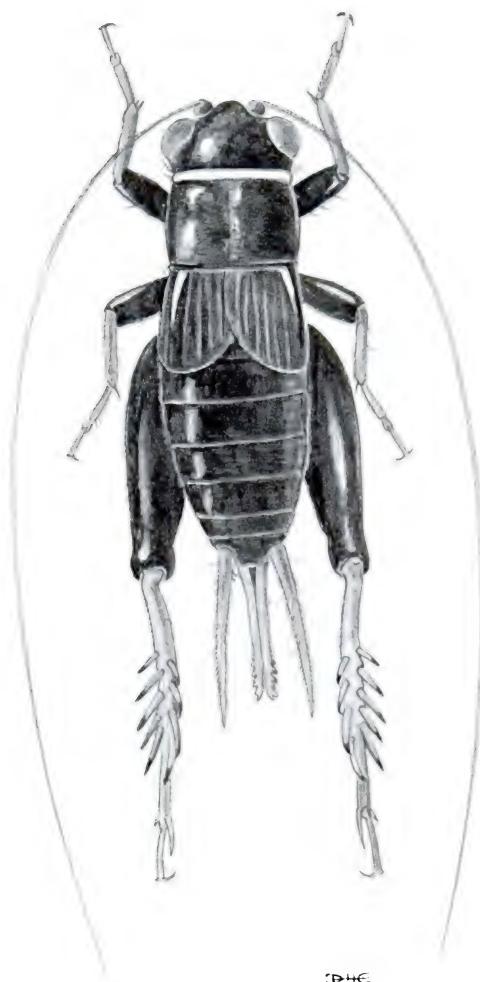


FIG. 144. *Narella tintinara*.

Maxillary palpi dark in proximal half of 4th segment and distal half of 5th segment. Legs I and II banded somewhat as in Fig. 140B. Femur III with regular oblique striations on outer face. Tibia III banded as in Fig. 122D, and with 3 inner and 3 outer subapical spurs and 3 inner and 3 outer apical spurs. Head ca. 0.98 times as wide as pronotum. Pronotum 1.27 times as wide as long. Femur III 2.88 times as long as pronotum and 1.44 times as long as tibia III. Latter 2.00 times as long as basitarsus III. Body length ca. 7 mm; femur III ca. 4.3 mm.

Females: Similar to male in color but top of abdomen strongly spotted. Ovipositor of female from type locality 2.65 times as long as pronotum and 0.87 times as long as femur III. At 19 km N Augusta, ovipositor 3.44 times as long as pronotum and at 12

mi W Pemberton, 3.06 times as long. Latter two females have fore and middle femora more strongly marked with black.

HOLOTYPE. ♂, Super Cave, Nambung River National Park, WA, 23 iv 1972 (A. M. Richards) ANC.

HABITAT. Collected in a cave by Aola Richards.

SPECIMENS. Holotype ♂ ANC. Same data, 2 ♂ 1♀ ANC. 19 km N August, WA, 21 iii 1971 (Riek) 1♀ ANC. 12 mi W Pemberton, WA, 31 iii 1968 (Common, Upton) 1♀ ANC.

NARELLA n. gen.

TYPE SPECIES. *Narella tintinara* n. sp.

This genus includes only the type species which is represented by a single female collected by the Monteiths in a rainforest pitfall trap.

RECOGNITION. Based on female. Auditory tympana absent. Tibia III with 4 inner and 3 outer subapical spurs, most distal spur distinctly smaller than rest, and not swollen or conical as in *Pteronemobius*. Ovipositor unique with its large spines on upper valves (Fig. 138J). FW's short and rounded, about same length as pronotum and overlapping medially.

We presume the male does not stridulate because the female lacks auditory organs, but the condition of his FW's cannot be known. He may retain a full stridulum (as in *Balamara gidya*), a rudimentary one (as in *Trigonidomorpha sjostedti*), or lack one (as in *Trigonidium* species).

Narella tintinara n. sp., Figs. 138J, 144

RANGE. Type locality in eastern NSW.

RECOGNITION. Females: In addition to characteristics given under genus, female has following features: Head entirely black but eyes brownish. Pronotum entirely black but front edge of pronotal disk pale. FW's, abdomen, and all femora black. All tibiae and tarsi brown, and cerci brown. Ovipositor with dorsal spines (Fig. 138J). Ovipositor 1.37 times as long as pronotum and 0.49 times as long as femur III. Body length 6.5 mm; femur III 3.7 mm; cerci 2.5 mm.

HOLOTYPE. ♀, Rainforest Pitfall 66B, Broken Head, NSW, 1975–1976, 30 m (G. B. and S. R. Monteith) QM.

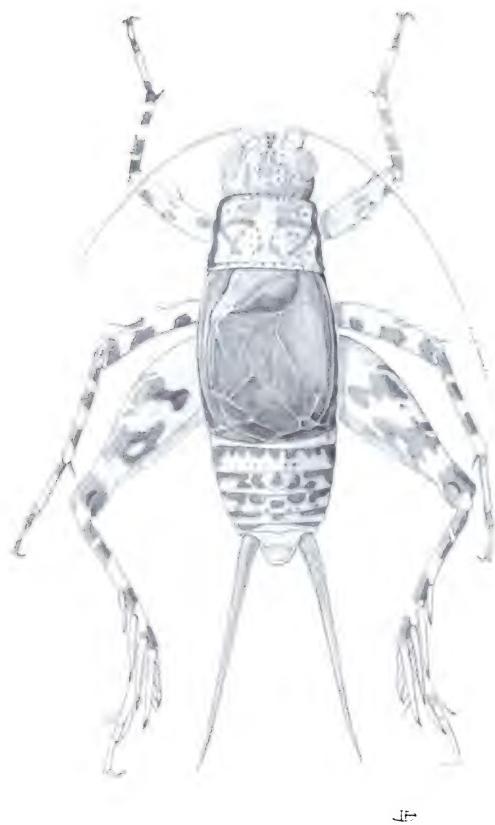


FIG. 145. *Thetella oonoomba*.

HABITAT. Collected in a rainforest pitfall.

SPECIMENS. Holotype ♀ QM.

TRIBE THETELLINI

THETELLA n. gen.

TYPE SPECIES. *Thetella oonoomba* n. sp.

This genus includes two known Australian species and we expect others will be discovered when coastal regions and offshore islands are investigated carefully. The genus is similar to *Apteronemobius* in general coloration and body shape but differs in having FW's in the male and its ability to sing. The genus appears to be widespread through the southwestern Pacific for we collected it on Fiji.

RECOGNITION. Genitalia with elongate epiphallus. Males with well-developed FW's. Females with tiny FW's or wingless. Both sexes with outer auditory tympana. Tibia III variable—with 2 or 3 inner

and 3 outer subapical spurs, and 2 or 3 inner and 3 outer apical spurs. Face usually with dark band running from bottom of eye to front articulation of mandible.

oonoomba

1. Male genitalia as in Fig. 147C.
2. Tibia III with 3 inner subapical spurs.
3. Tibia III with 3 inner apical spurs.
4. Female with small FW's.

tarnis

1. Male genitalia as in Fig. 147B.
2. Tibia III with 2 inner subapical spurs.
3. Tibia III with 2 inner apical spurs.
4. Females without FW's.

Thetella oonoomba n. sp., Figs. 145, 147BCDGJLM

RANGE. Shore and tidal areas of eastern QLD and NSW.

RECOGNITION. Males: Long-legged. Genitalia as in Fig. 147C. FW with well-developed mirror and file with 128–160 teeth. FW venation as in Fig. 147LM. Face with indefinite dark stripe descending from lower front corner of eye to front articulation of mandible. Side of pronotum and femur III marked as in Fig. 147. Tibia III with 3 inner and 3 outer subapical spurs and 3 inner and 3 outer apical spurs. Legs I and II banded with light brown. Holotype measurements: FW 2.24 times as long as pronotum, and 0.67 times as long as femur III. Femur III 1.21 times as long as tibia III. Latter 2.76 times as long as basitarsus III. Body length ca. 8.5 mm; femur III length ca. 5.2 mm; cercus ca. 4 mm. Body length of paratype ♀ from A-9 about 9 mm.

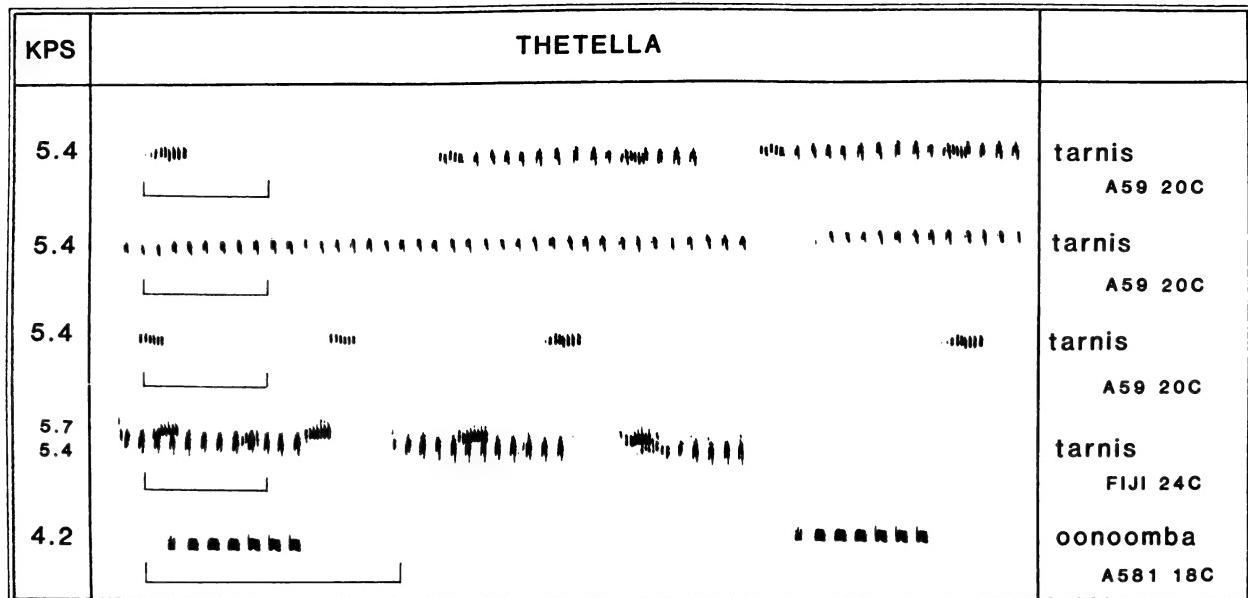
Females: Very similar to males, but FW only about $\frac{1}{3}$ length of pronotum. Ovipositor 0.79 times as long as femur III and 2.63 times as long as pronotum.

HOLOTYPE. ♂, A-9, Townsville, QLD, 22 vii 1968, ANC.

SONG. Fig. 146. Succession of chirps.

	p/s	ch/s	p/ch	kps	°C
A-9	ca. 40	1.2–1.5	6–8	6–7	22–23
A-581	25	1.0	7	4.2	18

HABITAT. Along water's edge in tidal areas. At Ross River a population of perhaps 50–100 individuals remained concealed beneath jumbled concrete slabs during the day, with a few individuals singing intermittently. As dusk approached they ventured

FIG. 146. *Thetella* songs. Scale = 0.5 s.

out, and males sang in exposed positions after dark. Disturbed individuals jump into the water and swim straight away from the bank until outside range of headlights. They continue even while no lights are on them, and they do not return quickly, indicating that this is not an accidental response.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 10♂ 6♀ ANC, 1♂ 1♀ UM, 1♂ 1♀ ANSP. A-581 1♂ ANC.

LISTENING RECORDS. A-4, A-12, A-57, A-58.

Thetella tarnis n. sp., Fig. 147BGKN

RANGE. Northeast QLD shore.

RECOGNITION. Males: Genitalia as in Fig. 147B. Body color pale with numerous brown markings. Sometimes top of body darker brown and with faint pale lines along lateral margins of pronotal disk. In darker individuals top of abdomen mostly brown and with pale spots. Tibia III with 3 outer and 2 inner subapical spurs, and 3 outer and 2 inner apical spurs; in these characteristics similar to *Apteronemobius*, so females, which are wingless, are difficult to distinguish. However relative lengths of spurs may be useful (compare Fig. 122G-M). Differing from *T. oonoomba* in wing venation, markings on the hind femora and genitalia, and number and shape of tibial spurs. FW venation as in Fig. 147N. Mirror poorly developed.

Holotype measurements: Pronotum 1.53 times as wide as long. FW 2.0 times as long as pronotum and 0.54 times as long as femur III. Femur III 1.24 times as long as tibia III. Latter 2.13 times as long as basitarsus III. Body length ca. 9.5 mm; femur III ca. 6.0 mm.

Females: (Based on females from Cape Tribulation area.) Very similar to males in color. Wingless. Body length ca. 10 mm. Ovipositor 0.83 times as long as femur III and 3.06 times as long as pronotum.

HOLOTYPE. ♂, A-46, along waterfront in Portland Roads, QLD, 11 viii 1968, ANC.

SONG. Fig. 146. At A-46 males produced succession of 2 to 13 pulse chirps at roughly 12 chirps in 10 seconds. Most chirps contain 3 or 4 pulses. Pulse rate estimated at 40/s.

HABITAT. At Portland Roads, Cape York, abundant in piles of stone around pier; sang only at night.

SPECIMENS. Holotype ♂ ANC. A-46 3♂ 1♀ ANC. A-34 2♂ 1♀ ANC.

Genus **APTERONEMOBIUS** Chopard
Apteronemobius Chopard 1929: 29. Type species: *A. longipes* Chopard 1929: 29, by monotypy.

This genus was described by Chopard to include a single species found in mangroves on Samoa. A

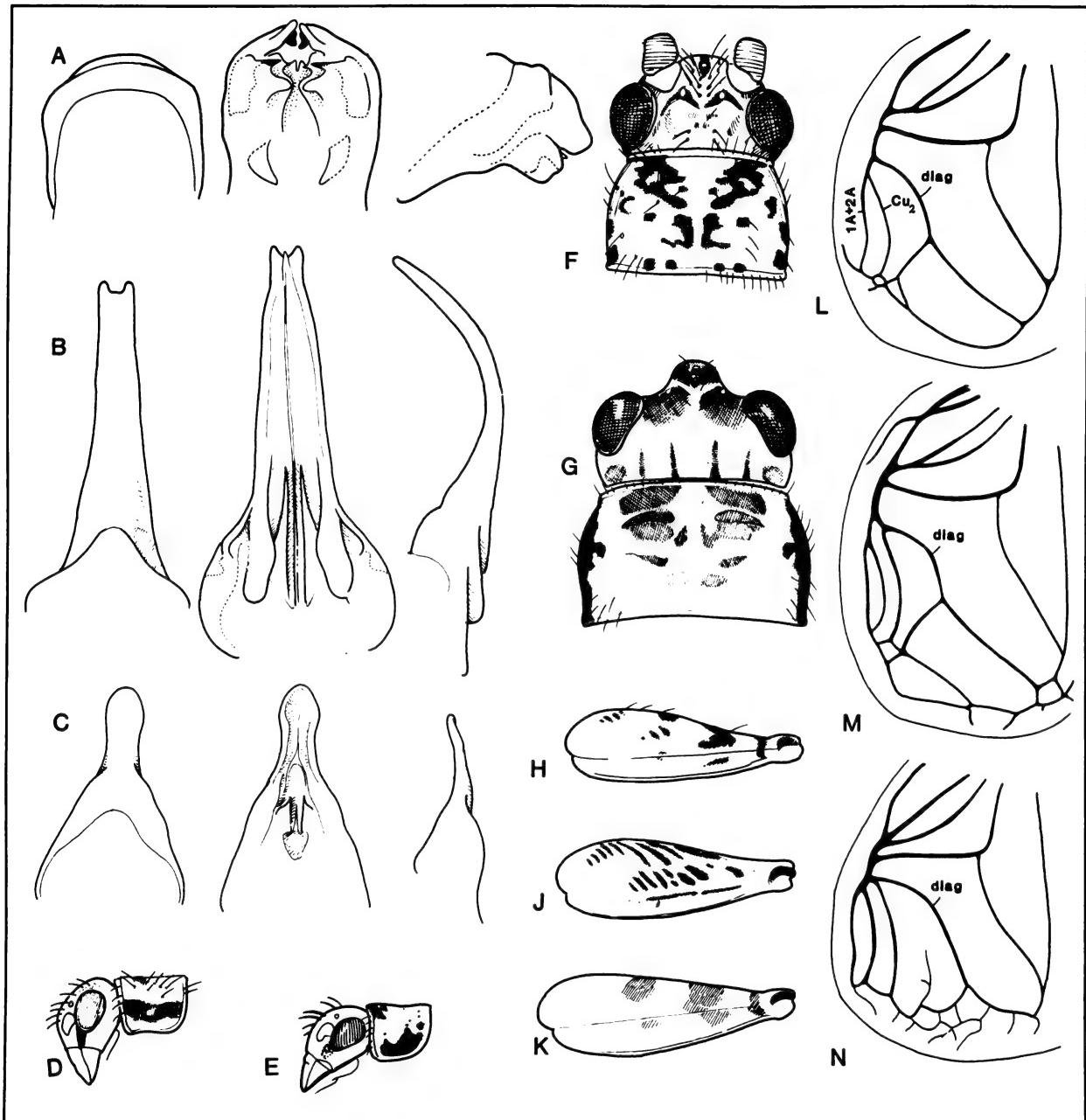


FIG. 147. *Apteronomobius* and *Thetella*. A, *A. darwini* male genitalia; B, *T. tarnis* genitalia; C, *T. oonoomba* genitalia; D, *T. oonoomba*; E, *A. darwini*; F, *A. darwini*; G, *T. tarnis*; H, *A. darwini* femur III; J, *T. oonoomba* femur III; K, *T. tarnis* femur III; L, *T. oonoomba*; M, *T. oonoomba*; N, *T. tarnis*.

footnote by P. A. Buxton included the following: ". . . when the tide is out the insects descend and move about on the mud, climbing the trunks of the mangrove trees again when the tide begins to flow.

Among the mangrove trees one finds coconuts which have rotted till one of the 'eyes' is open; the crickets hide in these in numbers . . . Although they do not readily take to the water, when

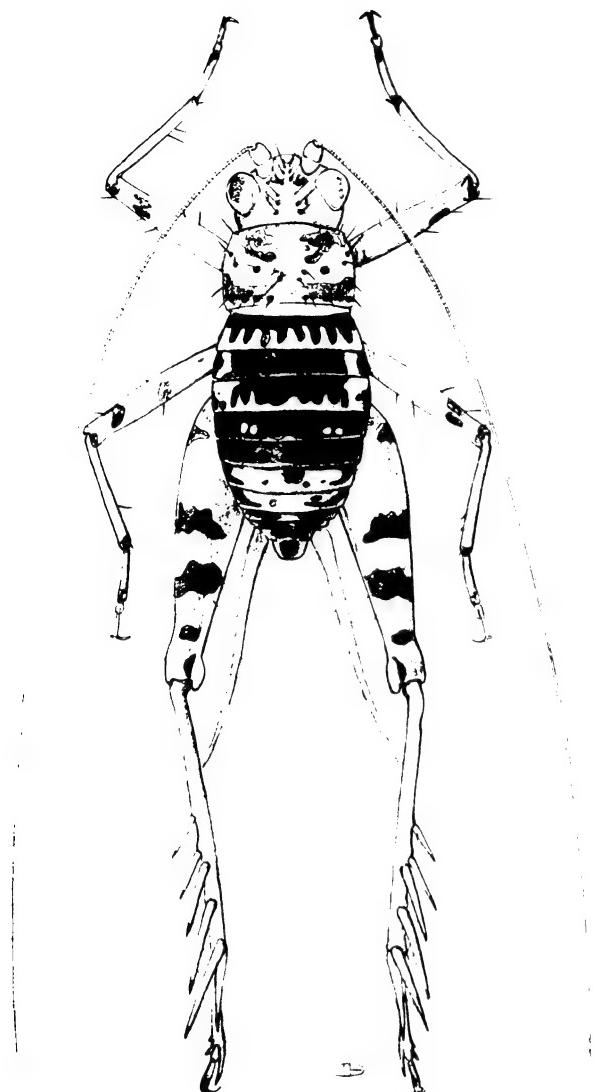


FIG. 148. *Apteronomobius darwini*.

they do so they swim well . . . Owing to their dark color they are difficult to detect on the mangrove stumps."

Chopard distinguished *Apteronomobius* from *Pseudonemobius* (syn. of *Paranemobius*) to which he evidently thought it closely related, by the com-

pletely apterous condition. The armature of the hind tibiae he apparently also considered unique: two nonapical spurs on each margin and only two internal apical spurs, three external. Although variations in tibial armature are commonly generic characters among the Nemobiinae, the great similarity of these two apterous species in habitat and general behavior as well as morphology, and their shared distinction of only two internal apical spurs on tibia III suggest that they may be considered congeneric. *Caconemobius* from Hawaii is also wingless and may be related to this genus.

RECOGNITION. (Australia only.) Both sexes wingless. Hind tibiae with 3 outer and 2 inner subapical spurs and 3 outer and 2 inner apical spurs. Abdomen rather bulbous. Sexes very similar in size and coloration. Body and legs have scattering of darker spots on otherwise very pale body.

***Apteronomobius darwini* n. sp., Figs. 147AEFH,
148**

RANGE. Type locality on shore near Darwin.

RECOGNITION. Both sexes wingless and otherwise very similar. Tibia III with 3 outer and 2 inner subapical spurs, 3 outer and 2 inner apical spurs. Inner apical and subapical spurs with fringes of long setae. Without tympana. Head and legs patterned as in Figs. 147 FH. Male genitalia as in Fig. 147A. Legs long. Scape large. Top of abdomen mosaic of light and dark areas. Ovipositor 0.76 times as long as femur III and 3.63 times as long as the pronotum. Holotype measurements: Pronotum 1.69 times as wide as long. Femur III 4.31 times as long as pronotum and 1.17 times as long as tibia III. Latter 2.53 times as long as basitarsus III. Body length 7 mm; femur III length ca. 5.2 mm; cercal length ca. 4 mm.

HOLOTYPE. ♂, A-132 Casuarina Beach near Darwin, NT, 25 ix 1968, ANC.

HABITAT. Soft-bodied quick-moving crickets collected at night near and under decaying logs at tide-line where narrow sandy beach met mangrove roots. Seemed to live in colonies.

SPECIMENS. Holotype ♂ ANC. A-132 ANC 1♂ 1♀ ANSP.

SUBFAMILY TRIGONIDIINAE

This subfamily includes 24 world genera and about 300 known species; these are arranged into two tribes, the Trigonidiini and the Phylloscyrtini by Chopard (1968: 303, 343). More than a third of the species are included in the nearly worldwide genus, *Anaxipha*, which has six species in Australia. *Metioche*, with 45 known species (3 in Australia) also includes species from most parts of the Old World and from Bolivia and Peru. Ten genera containing 39 species are restricted to the New World, and two monotypic genera are restricted to Africa. There are no European species north of the Mediterranean region, and only a single species, *Trigonidium cicindeloides* Rambur, is reported from Europe. Three species each are reported in Japan and China. Australia has 11 genera of *Trigonidiinae*, two of them new.

Like other vegetation-inhabiting groups of crickets, Trigonidiinae species that have become both flightless and mute nevertheless retain the forewings as rather horny coverings over the abdomen, while many flightless mute Nemobiinae have lost all four wings. For reasons unknown, some mute trigonidiines retain their tibial tympana while others, as with most other crickets, have lost them.

Generic designations among the Australian members of this subfamily have proved unsatisfactory in several regards. Under each genus we have indicated how we have modified the classification system adopted by Chopard (1951).

RECOGNITION. Trigonidiinae are all small, slender, fragile crickets somewhat resembling Nemobiinae in size and general appearance. The chief difference between members of these two subfamilies seems to involve the structure of the middle tarsal segment, in turn relating to the fact that Nemobiinae are chiefly on the soil surface while nearly all Trigonidiinae climb on vegetation. In Trigonidiinae the middle tarsal segment bears a prominent adhesive pad, while in Nemobiinae it is laterally compressed and has no noticeable pad. In Trigonidiinae the hind tibiae virtually always have 2 inner and 3 outer apical spurs and 3 inner and 3 outer subapical spurs and the hind tibiae are nearly as long as the hind femora. The Nemobiinae usually have 3 inner and 3 outer apical spurs and 3–4 inner and 3–4 outer subapical spurs. The only Australian

nemobiines with 2 inner apical spurs are *Apteronomobius* and one species of *Thetella*. FW's present or absent. HW's present or absent, hidden beneath FW's or extending beyond cerci. Front tibiae with or without auditory tympana.

GENERIC ASSIGNMENT

Presently the genera of Trigonidiinae are defined principally on the basis of structures involved in acoustical signalling, i.e., the presence or absence of the male stridulatory file and the presence or absence of inner and outer auditory tympana. Because acoustical signalling has been lost independently a number of times in crickets, it is likely that some taxa lacking the male stridulum and all traces of auditory tympana are polyphyletic. Thus, the genus *Trigonidium* may be made up of several distinct lineages which independently lost the male stridulum and the auditory tympana. The matter deserves more attention, but for the time being we have taken the expedient course and have used the signalling structures in our classification.

KEY TO THE GENERA OF TRIGONIDIINAE

MALES

1. Tibia I with distinct inner tympanum (with or without outer tympanum) 2
Tibia I without inner tympanum, or with small depression or dimple, or difficult to tell if tympanal membrane present or not (with or without outer tympanum) 8
2. Tibia I with well-developed outer tympanum (almost as large as inner or larger) 5
Tibia I with very small outer tympanum (much smaller than inner) or without outer tympanum 3
3. FW without stridulatory file and without mirror 4
FW with stridulatory file and with narrow mirror (Figs. 158, 160C) *Cyrtotiphoides*
4. Body color entirely pale green or pale yellowish and always without dark spots. Dorsum of head very flat and eyes elongate (side view) (Fig. 157K). (Genitalia characteristic for genus: see Fig. 157) *Metiochodes*
Body color variable; most species with black stripes or spots; pale green species with small dark spots on femora or tibiae. Dorsum of head not very flat, or not as flat as above (Fig. 153). (Genitalia characteristic for genus: see Fig. 152) *Amusurgus*
5. FW with large mirror 6
FW without mirror 7
6. All legs black, body elongated (Fig. 166) ... *Homoeoxipha*

- Legs not black. Body not elongated (Fig. 161) *Anaxipha* (Mjöbergi Group)
7. FW with small stridulatory file (Figs. 174, 176EF) *Trigonidomorpha* (part)¹
- FW without small stridulatory file *Metioche* (part)¹
8. FW with stridulatory file and large mirror 9
- FW without stridulatory file and without mirror 11
9. Tibia I with tympanum 10
- Tibia I without tympanum *Balamara* (part) (*B. gidya*)
10. Body mostly blackish. Dorsum with pale lateral bands (Fig. 171B). Face banded as in Fig. 173D. Male genitalia as in Fig. 173F *Balamara* (part) (*B. marroo*)
- Body and face not marked as above. Genitalia as in Fig. 164 *Anaxipha* (part)
11. Tibia I with outer tympanum *Parametioche*
- Tibia I without outer (or inner) tympanum 12
12. FW with small stridulatory vein (Fig. 176 EFG) *Trigonidomorpha* (part)
- FW without small stridulatory vein 13
13. FW not reaching cerci, last few segments exposed. Tibia I extremely slender. (Yellow insects. Females with ovipositor at least 2.2 times as long as pronotum) *Dolichoxipha*
- FW reaching the cerci. Last few segments of abdomen covered. Tibia I not exceptionally slender: color variable 14
14. Tibia I with a depression or dimple in tympanal region. Dorsum of FW's flat in lateral profile (Fig. 170E) *Metioche* (part) (rare forms)
- Tibia I without any trace of depression or dimple. Dorsum of FW's more strongly arching in lateral profile (Fig. 180A) 15
15. Dorsum of body black and with distinct lateral pale bands (Fig. 171A). Face marked as in Fig. 173J. (Note: This species is convergently very similar to *Trigonidium* species and is more closely related to species which retain a stridulatory file) *Balamara* (part) (*B. albovittata*).
- Dorsum of body without strong lateral pale bands. Face not marked as above *Trigonidium*
- FEMALES
1. Tibia I with inner tympanum (with or without outer one) 2
- Tibia I without inner tympanum (with or without outer one) 6
2. Tibia with well-developed outer tympanum 4
- Tibia I with very small outer tympanum (much smaller than inner) or without outer one 3
3. Dorsum of head strongly flattened (viewed from side) (Fig. 157K). Body color pale yellow-white or pale green and without any dark spots *Cyrtotrophoides* and *Metiochodes*
- Dorsum of head, rounded (Fig. 153ABC) usually not flattened (but see Fig. 153D). Body color variable, if
- pale green then with small dark spots on femora or tibiae *Amusurgus*
4. Legs I and II black. Head black. Pronotum reddish brown. Body very slender (Fig. 166B) ... *Homoeoxipha*
- Legs I and II not black, and otherwise not fitting above description 5
5. Dorsum usually with dorsal gland (Fig. 170N). Scape of antennae always black. Head and face black or with black markings *Metioche* (part) and *Trigonidomorpha* (part) (common forms)
- (Females of these two genera are difficult to separate when not associated with males. When they lack the dorsal gland they are difficult to separate from *Anaxipha* when not associated with males. Occasionally they lack tympana and are then likely to be confused with *Trigonidium*. See also Table 13).
- Dorsum without a dorsal gland. Scape of antennae not black. Head and face pale brown or yellowish *Anaxipha* (part)
6. Tibia I with an outer tympanum 7
- Tibia I without an outer tympanum 8
7. Dorsum of body with distinct lateral pale bands (Fig. 171). Face banded as in Fig. 173D *Balamara* (part) (*B. marroo*)
- Dorsum of body not as above. Face without strong bands *Anaxipha* and *Parametioche*
8. Forewings not reaching cerci. Ovipositor long, at least 2.2 times as long as pronotum. Tibiae I and II extremely slender *Dolichoxipha*
- Forewings reaching or extending beyond cerci. Ovipositor shorter, stouter, less than 2.0 times as long as pronotum. Tibiae I and II not as slender 9
9. Tibia I with dimple or shallow inconspicuous depression at the usual position of inner or outer tympanum *Trigonidomorpha*, *Metioche* (short HW forms)
- Tibia I without any trace of dimple or tympanal depression 10
10. FW's with white bands along margins (Fig. 171). Face banded as in Fig. 173DJ *Balamara* (part)
- Dorsum of FW's without white bands along margins. Face not banded as in Fig. 173DJ *Trigonidium*

Genus AMUSURGUS Brunner

Amusurgus Brunner von Wattenwy 1893: 212. Type species: *A. fulvus* Brunner, Pegu, Burma, by monotypy, junior synonym of *Eneoptera oedemeroides* Walker 1871: 11 from Ceylon, according to Chopard 1968: 330.

Paranaxipha Chopard 1925: 530. Synonymized by Chopard 1968: 330.

Chopard considers *Amusurgus fulvus* Brunner, the type of the genus, to be a junior synonym of *Eneoptera oedemeroides* Walker 1871: 11 (*Cyrtotrophoides oedemeroides*, Kirby 1906: 81; *Amusurgus oedemeroides*, Chopard 1968: 330). *E. oedeme-*

¹ Common form.

TABLE 12. Comparison of the genera of Trigonidiinae: males.

	Auditory tympana I, inner O, outer -, absent	FW's hairy	Dorsum head very flat	Males with stridulum	Mirror	Dorsal gland present	Macrop-terous	FW profile
<i>Amusurgus</i>	I/-	I/o* rare	yes	no	no	none	yes	yes flat
<i>Metiochodes</i>	I/-	I/o*	yes	yes	no	none	yes	yes flat
<i>Cyrtoxiphoides</i>	I/-	-	no	yes	yes	very slender (Fig. 160C)	yes	yes flat
<i>Anaxipha</i>	I/O	-/O	no	no	yes	(Figs. 165AF)	sometimes	often flat
<i>Homoeoxipha</i>	I/O	-	no	no	yes	slender (Fig. 166)	yes	often flat
<i>Metioche</i>	I/O, I/-, -/- usual	-	no	no	no	none	yes, sometimes small	often flat, slightly rounded in micropterous ♂
<i>Trigonidomorpha</i>	I/o	-/-	no	no	yes, small no mirror	none	yes or no	often flat (macrop.) rounded (microp.)
<i>Balamara</i>	-/o	-/-	-	-	yes no**	yes no**	no	flat or rounded**
<i>Parametioche</i>	-/O	-	no	no	no	none	no	rounded
<i>Dolichoxipha</i>	-/-	-	no	no	no	none	no	flat
<i>Trigonidium</i>	-/-	-	no	no	no	none	no	rounded

* Tiny opening.

** *B. albovittata*.

TABLE 13. Comparison of the genera of Trigonidiinae: females.

	Auditory tympana		Dorsal gland present	FW profile (flat: Fig. 170E) (rounded: Fig. 180A)	FW hairy	Dorsum of head very flat (Figs. 153D, 157K)	Macrop-terous	FW's not reaching cerci
<i>Amusurgus</i>	I/-	I/o* rare	yes	flat	yes	rarely	yes	no
<i>Metiochodes</i>	I/-	I/o*	yes	flat	yes	yes	yes	no
<i>Cyrtoxiphoides</i>	I/-	-	yes	flat	-	yes	yes	yes
<i>Anaxipha</i>	I/O or -/O	-	sometimes	flat	no	no	yes, no	no
<i>Homoeoxipha</i>	I/O	-	yes	flat	no	no	yes	no
<i>Metioche</i>	I/O	I/-, -/- usual	yes, sometimes small	round in micropt.	no	no	yes, no	no
<i>Trigonidomorpha</i>	I/O	-/- usual	yes or no	round in micropt.	no	no	yes, no	no
<i>Balamara</i>	-/o or -/-	-	no	flattish or rounded	no	no	no?	-
<i>Parametioche</i>	-/O	-	no?	rounded	no	no	no	no
<i>Dolichoxipha</i>	-/-	-	no	flat	no	no	no	yes
<i>Trigonidium</i>	-/-	-	no	rounded	no	no	no	no

* Tiny opening.

TABLE 14. Comparison of *Amusurgus* species.

	Dorsal field of FW much lighter than lateral field	Face	Femur III	Tibia III	Segment 5 of max. palpi dark	Other
<i>kanyakis</i>	yes	banded or largely dark	with line of spots on top	spotted and without apical dark band	yes	
<i>angustus</i>	yes	banded	spotted on top and sides or largely unspotted	spotted and with apical dark band	yes	
<i>tinka</i>	yes	mostly dark, faintly banded	uniform	uniform	no	
<i>fascifrons</i>	yes	banded	2 distal spots		yes	
<i>mubboonis</i>	no	narrow, dark stripes	uniform	uniform	no	
<i>noorundi</i>	no	pale	uniform	uniform	slightly darker than seg. 4	Tibia I and II with 2 proximal dark spots
<i>hackeri</i>	no	pale	uniform	uniform	no	Tibia I and II with 2 proximal dark spots
<i>nilarius</i>	no	uniform yellow-brown	uniform	uniform	no	
<i>minmirri</i>	no	uniform medium-brown	uniform	uniform	no	

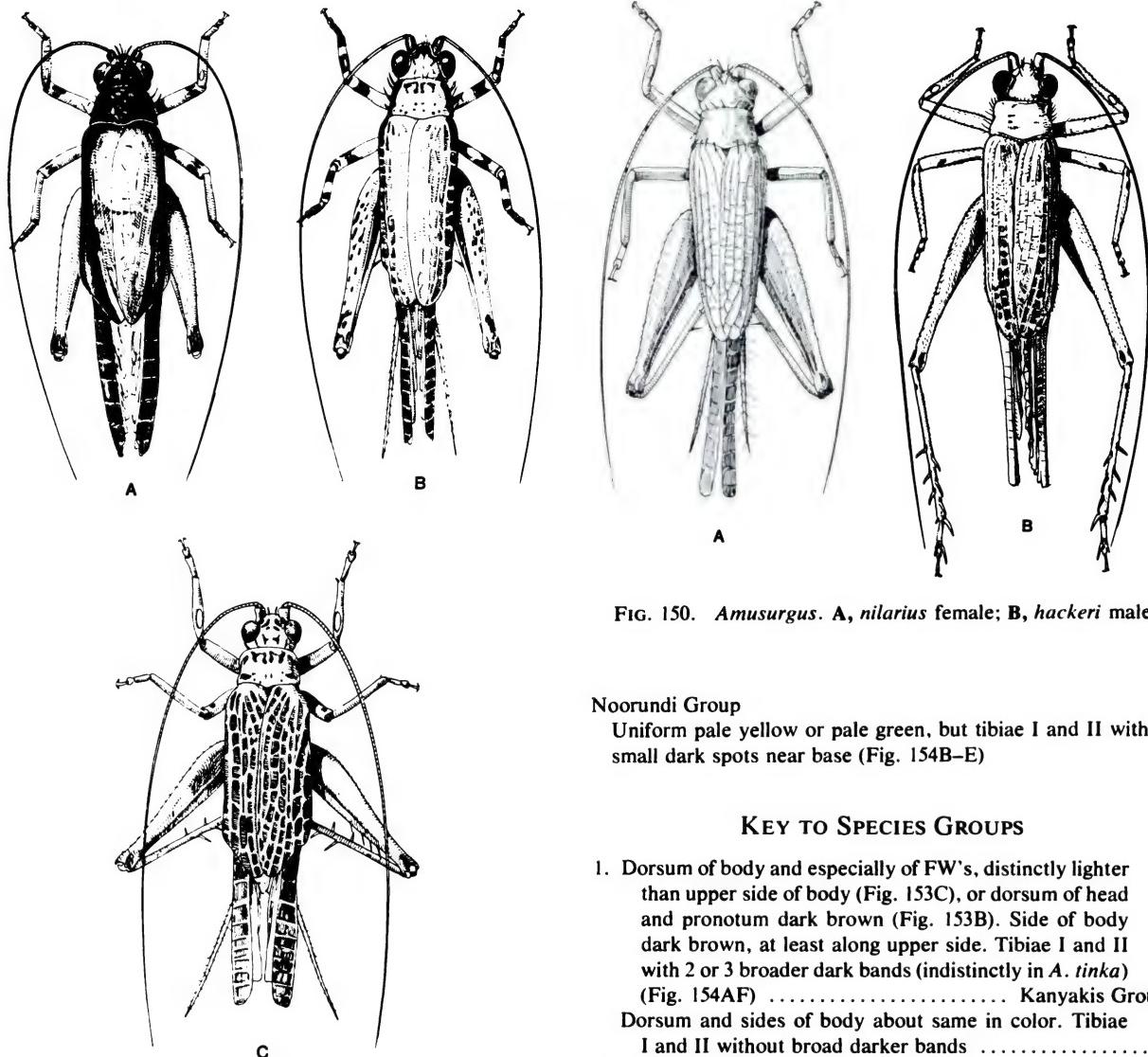
roides, is from Ceylon and *A. fulvus* is from southern Burma. Although we have not compared these species, we believe it unlikely, on the basis of the distances and water barriers involved, that the two are synonyms. If *A. fulvus*, which we have not yet examined, is indeed a synonym of *E. oedermeroides*, as suggested by Chopard, then the Australian crickets will belong to a new genus because *E. oedermeroides* possesses a stridulum and the genitalia are quite different from Australian species.

This genus, as now understood, includes 16 species, 9 from Australia and the remainder from India, Ceylon, Sumatra, Borneo, Malaysia, and New Guinea.

The Australian species are all from eastern rain

forests or monsoon forests near Darwin. They fly to lights frequently, and we saw individuals walking on the foliage of trees below the forest canopy. Our impression is that *Amusurgus* species may all live in trees.

RECOGNITION. (Australian species only.) Males without stridulum. Both sexes with large inner tympana and with either tiny outer tympanum or slight groove in place of tympanum. Genitalia with prominent lobes (Fig. 152). Head usually rounded in profile (but flat in several species, e.g., *A. noorundi*). Abdomen with dorsal glands. Dorsum of head usually with prominent bristles. Body usually with prominent dark markings; even very pale species usually have dark spots on legs, or have cells of

FIG. 149. *Amusurgus*. A, *tinka*; B, *angustus*; C, *mubboonis*.

FW's darker than veins. (In *Amusurgus oedemerooides* (Walker) from Ceylon, outer tympanum well-developed, but about half the size of inner.)

Kanyakis Group

Side of body darker than dorsum (or head and pronotum dark brown, Figs. 149AB, 153BC).

Mubboonis Group

Head and pronotum pale with small narrow dark streaks (Figs. 149C, 153A)

Nilarius Group

Uniformly pale yellow-brown or pale brown; without any dark spots (Fig. 150A).

Noorundi Group

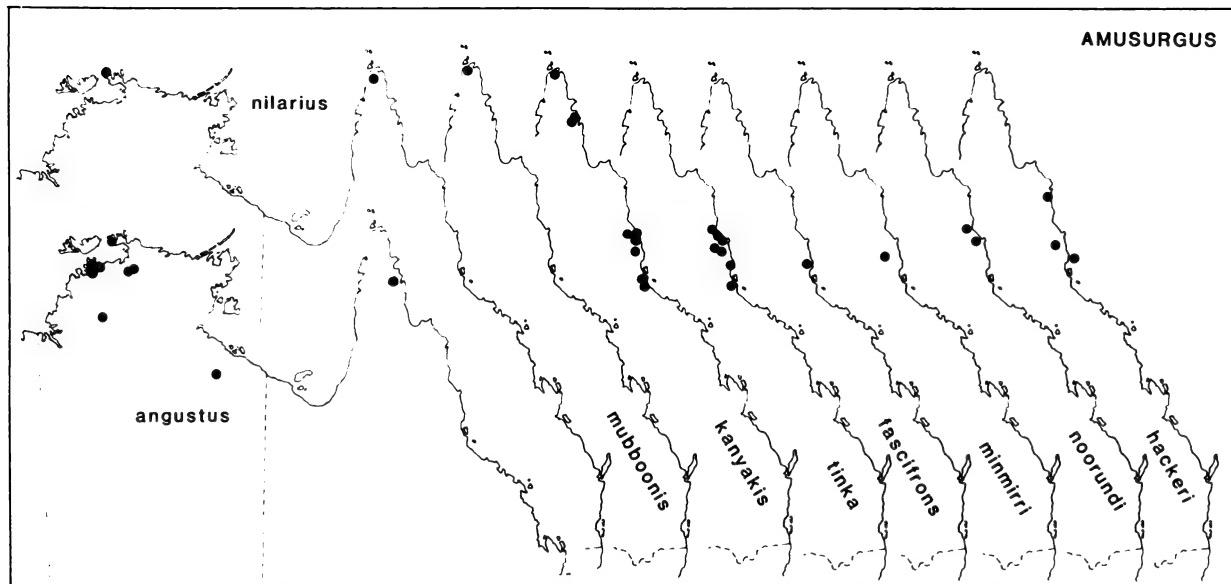
Uniform pale yellow or pale green, but tibiae I and II with 2 small dark spots near base (Fig. 154B-E)

KEY TO SPECIES GROUPS

1. Dorsum of body and especially of FW's, distinctly lighter than upper side of body (Fig. 153C), or dorsum of head and pronotum dark brown (Fig. 153B). Side of body dark brown, at least along upper side. Tibiae I and II with 2 or 3 broader dark bands (indistinctly in *A. tinka*) (Fig. 154AF) Kanyakis Group
Dorsum and sides of body about same in color. Tibiae I and II without broad darker bands 2
2. Face with narrow dark stripes. Dorsum of head and pronotum with small dark markings (Figs. 149C, 153A)
..... Mubboonis Group
Face uniform in color (pale green, pale yellow, or light brown). Dorsum of head and pronotum plain and without dark spots 3
3. Body color pale yellow or pale green. Tibiae I and II with 2 dark spots near base (Fig. 154DE) Noorundi Group
Body color yellowish or light brown. Tibiae I and II without dark spots near base Nilarius Group

KANYAKIS GROUP

Side of body dark; dorsum of body brown to pale brown (but in *A. tinka* top of head and pronotum

FIG. 151. *Amusurgus* distributions.

almost as dark as sides). Face either entirely dark or with strong dark bands. Femora I and II usually with distinct distal dark band. Tibiae I and II with 2 or 3 dark bands (except *A. tinka*). Femur III spotted, usually spotted on upper and outer face (except *A. tinka* and some specimens of *A. kanyakis*). Most reliable way to distinguish species is to examine male genitalia.

KEY TO SPECIES OF KANYAKIS GROUP

1. Top of head and pronotum dark brown; about as dark as sides. Femur III without dark spots or markings proximal to knee. Tibia III uniform and unspotted. Male genitalia as in Fig. 152F *tinka*
Top of head and pronotum distinctly paler than sides. Femur III with definite dark spots or markings proximal to knee (Fig. 154GH). Tibia III usually spotted at base of each spur (Fig. 154IJ) 2
2. Tibia III with dark band at apex (Fig. 154J). Femur III usually with scattering of small dark spots on outer face (Fig. 154H) (but sometimes these are lacking). Male genitalia as in Fig. 152B *angustus*
Tibia III without dark band at apex (Fig. 154I). Femur III with line of dark spots along upper face or with only larger spots on outer face near knee (Fig. 154G). Male genitalia as in Fig. 152A or 152G 3
3. Femur III with line of dark spots along dorsal face. Male genitalia as in Fig. 152G *kanyakis*
Femur III without line of dark spots on upper face. Male genitalia as in Fig. 152A *fascifrons*

***Amusurgus kanyakis* n. sp., Figs. 152G, 153CJLOU, 154AGI**

RANGE. Forests of northern coastal QLD.

RECOGNITION. Very similar to *A. angustus* and *A. fascifrons* (see Table 14 and above key). Body pale on dorsum and dark on sides; dark band on side runs from face to ends of HW's. Face with or without light and dark bands (Fig. 153CJ). Femur III usually with line of spots along upper face (Fig. 154G). Legs I and II marked as in Fig. 154A. Differs from *A. angustus* by lacking dark band at apex of tibia III (Fig. 154I). Inner face of femur III with dark marks in first third and last third. Male genitalia as in Fig. 152G. Holotype measurements: FW 5 times as long as pronotum and as long as femur III. Body length 6.0 mm (9.8 to end of HW); femur III length 4.6 mm; cerci 4.2 mm.

HOLOTYPE. ♂, A-19, Crystal Creek, 41 miles north of Townsville, on Route 1, QLD, 31 vii 1968, ANC.

HABITAT. Along rivers and in lowland rain forests.

SPECIMENS. Holotype ♂ ANC. A-19 1♂ ANC. A-45, 46 1♀ ANC. QUEENSLAND: Bamaga, Cape York, 15-18 vi 1969 (Monteith) 1♂ 3♀ UQC. 4.5 mi NE Innisfail, rain forest, 4 xi 1966 (Britton) 1♀ ANC. 5 mi W Tully, 23 iv 1955 (Norris, Common) 1♂ ANC. Barron Falls, nr Kuranda, 12 xii 1964 (Brooks) 1♀ ANC.

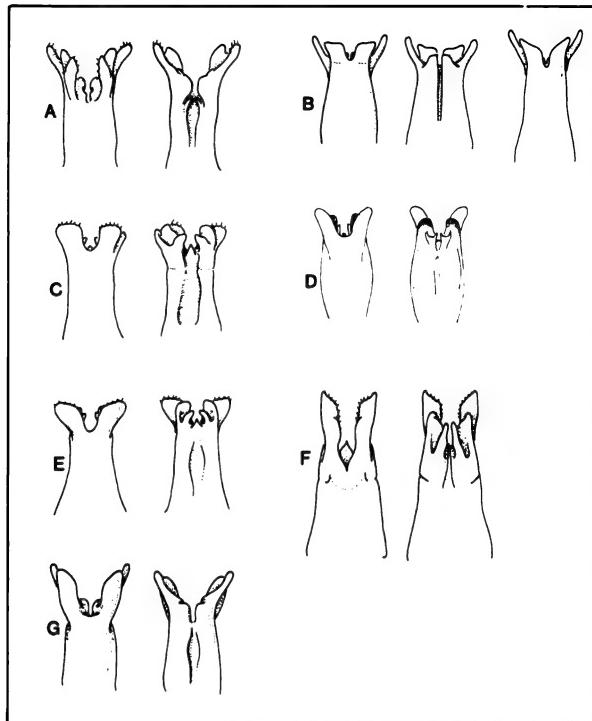


FIG. 152. *Amusurgus* male genitalia. A, *fascifrons* holotype; B, *angustus* A-45; C, *noorundi* Innisfail QLD; D, *mubboonis* holotype; E, *hackeri* Gordonvale QLD; F, *tinka* El Arish QLD; G, *kanyakis*.

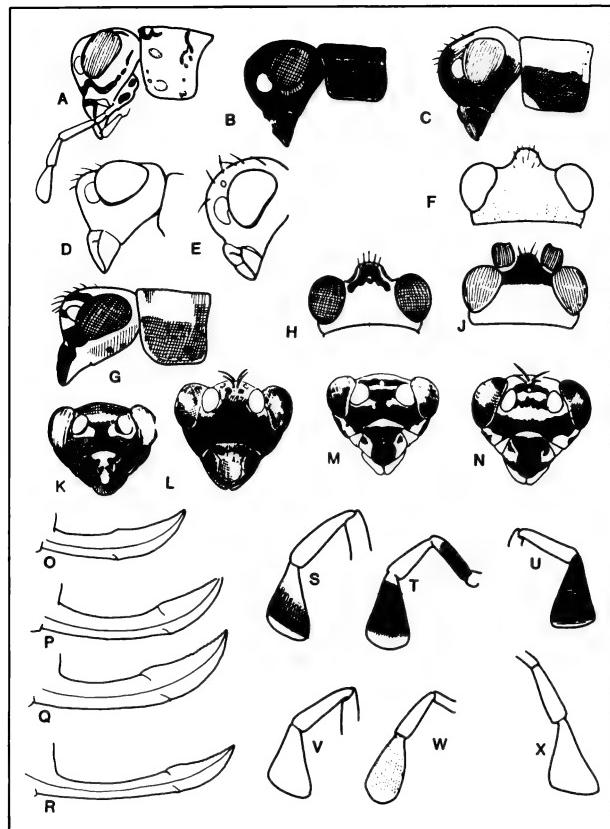


FIG. 153. *Amusurgus*. A, *mubboonis* holotype; B, *tinka*; C, *kanyakis*; D, *noorundi*; E, *nilarius*; F, *noorundi*; G, *angustus*; H, *angustus*; J, *kanyakis* ♀; K, *tinka*; L, *kanyakis*; M, *angustus* A-45; N, *angustus* A-131. O-R, female ovipositors: O, *kanyakis*; P, *nilarius*; Q, *minmirri*; R, *hackeri* A-27. S-X labial palpi: S, *noorundi*; T, *angustus*; U, *kanyakis*; V, *minmirri* holotype; W, *tinka*; X, *nilarius* holotype.

19 mi SW Ingham, 10 v 1961 (Straatman) 1♀ ANC. Cairns (Ilingworth) 3♀ BISH. Lockerbie, Cape York, 1♂ 1♀ ANSP.

Amusurgus angustus (Chopard), Figs. 149B, 152B, 153GHMNT, 154FHJ

Metioche angusta Chopard 1925: 37. Holotype ♀, Herberton, QLD (Mjöberg) sm. Type examined.

RANGE. Northern Cape York and northern NT.

RECOGNITION. Side of body dark and top of body pale (as in *A. kanyakis*). Side of femur III varying from unspotted to strongly spotted (Fig. 154H). Differs from *A. kanyakis* by having broad dark band at apex of tibia III (Fig. 154J). Top of face as in Fig. 153GMN. Top of head flatter than *A. kanyakis* in lateral profile. Male genitalia as in Fig. 152B. HW's extend well beyond abdomen. FW ca. 4.7 times as long as pronotum and as long as femur III. Femur III as long as tibia III. Body length ca. 6.25 mm; femur III ca. 4.3 mm; cerci 4.2 mm.

HABITAT. Flies to lights and may also be captured

by sweeping through foliage in forests and forest edges.

SPECIMENS. Holotype ♀ sm. A-45 1♂ 1♀ ANSP. A-131 1♂ 1♀ ANC. A-132 1♀ ANC. NORTHERN TERRITORY: 29 mi SW Dorisvale HS, 14.48S 131.02E, 9 viii 1968 (Mendum) 1♂ ANC. 12.35S 132.52E, Magela Ck, 2 km N Mudginbarry HS, 14 xi 1972 (Upton) 1♂ 3♀ ANC. 12.47S 132.51E, Baroalba Ck. Springs, 19 km NNE Mt Cahill, 28 x 1972 (Key) 1♀ ANC. 12.25S 132.58E, near Cahills Crossing East Alligator R, 31 x 1972 (Key) 2♀ ANC. 16.10S 136.03E, Batten Ck, 31 km WSW Borroloola, 16 iv 1976 (Key, Balderson) 1♂ 1♀ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 19 ii 1977 (Weir) 1♀ ANC. 15 km NE Darwin, 13 ii 1961 (Gressitt) 9♂ 15♀ BISH.

Amusurgus fascifrons Chopard, Fig. 152A

Amusurgus fascifrons Chopard 1951: 475. Holotype ♂, Cairns, QLD, SAM. Type examined.

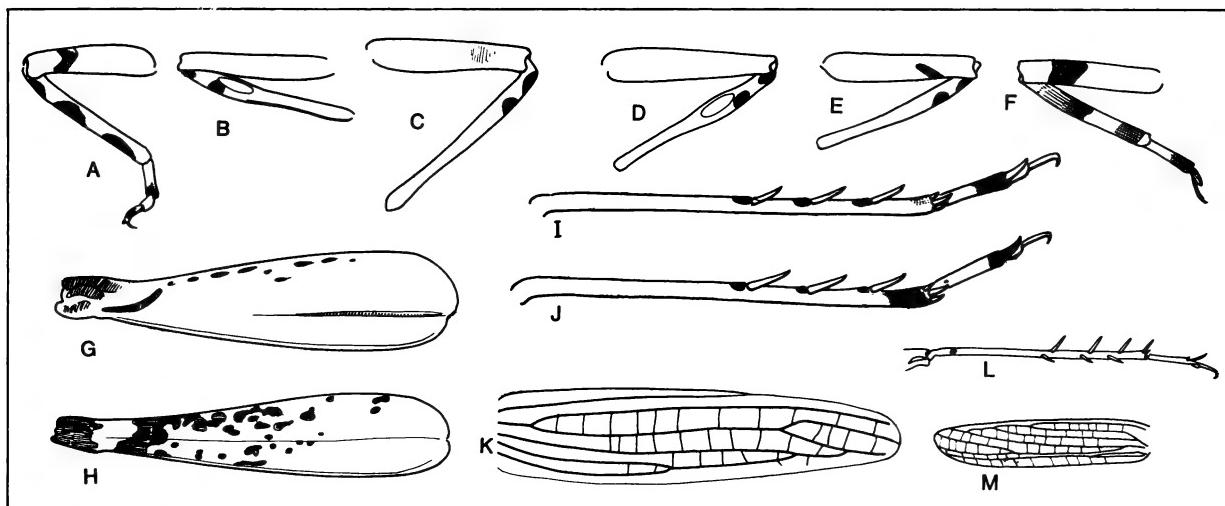


FIG. 154. *Amusurgus*. A, *kanyakis* ♀, outer leg II; B, *noorundi* inner leg I; C, *noorundi* outer leg II; D, *hackeri* inner leg I; E, *hackeri* outer leg II; F, *angustus* A-45, outer leg I; G, *kanyakis* outer femur III; H, *angustus* A-45 outer femur III; I, *kanyakis* outer tibia III; J, *angustus* outer tibia III; K, *nilarius* FW holotype; L, *hackeri* tibia III; M, *hackeri* FW A-32.

RANGE. Northcentral coastal QLD.

RECOGNITION. Similar to *A. kanyakis*, *A. angustus* and *A. tinka* in having dorsal body surface pale and sides dark. Genitalia as in Fig. 152A. Face banded somewhat as in *A. angustus*. Legs I and II banded somewhat as in *A. angustus*. Lateral ocelli circled with brown. Femur III with two small brown spots near the apex. Outer face of femur III not spotted as in *A. angustus*.

HABITAT. Probably forested regions of northeast Australia.

SPECIMENS. Holotype ♂ SAM. Cardstone, Tully Falls, QLD, 23 i 1965 (Brooks) 1♂ ANC.

Amusurgus tinka n. sp., Figs. 149, 152F, 153BKW

RANGE. Northcentral coastal QLD.

RECOGNITION. Sexes similar. Head, thorax, and sides of FW's dark brown. Top of FW's and legs pale brown. Face brown with broad dark brown band running above clypeus and between lower margins of eyes and then ventrally and posteriorly below eyes (Fig. 153K). Top of head more or less uniformly brown. Scape brown, flagellum pale brown with intermittent brown segments. Maxillary palpi pale brown. Pronotum dark brown; darkest on lateral lobes. HW's extending beyond tips of cerci. Femora I and II with a darker ring distally. Tibiae I and II unbanded. Femur III pale brown. Tibia III not spotted or banded (as in *A. angustus*) and ter-

gum of abdomen pale reddish-brown. Genitalia as in Fig. 152F. Ovipositor 1.91 times as long as pronotum. Holotype measurements: FW 4.98 times as long as pronotum and 1.098 times as long as femur III. Body length 6.24 mm; femur III 4.17 mm; cerci 4.0 mm.

HOLOTYPE. ♂, A-24, in rain forest along road to Mission Beach from Tully, QLD, 6 ix 1968, ANC.

HABITAT. This mute species taken while we examined foliage of slender tree 20–30 feet tall, which we bent over in search for another species taped in area.

SPECIMENS. Holotype ♂ ANC. A-24 1♂ ANC, 1♂ 1♀ ANSP. A-27 1♀ ANC. A-29 1♂ UM. A-57 1♀ ANC. QUEENSLAND: 1 mi N Kuranda, 1200 ft, 23 iv 1969 (Common, Upton) 2♂ 1♀ ANC. 2 mi W Mission Beach, near Tully, 18 iv 1969 (Common, Upton) 1♀ ANC. 9 mi E El Arish, 7 iii 1964 (Common, Upton) 1♂ ANC. 17 mi S Atherton, 3000 ft, 19 iii 1964 (Common, Upton) 1♂ ANC. 3 mi W Mossman, 13 iii 1964 (Common, Upton) 1♂ 2♀ ANC. Barron Falls, near Kuranda, 6 ii 1965 (Brooks) 1♂ ANC. The Boulders, near Babinda, 10 v 1967 (Colless) 1♂ ANC. Mossman, 25 iii 1967 (Upton) 2♂ ANC. Kuranda, 200 m, 13 iii 1956 (Gressitt) 3♂ 1♀ BISH.

MUBBOONIS GROUP

This group contains a single known species. See below for recognition.

Amusurgus mubboonis n. sp., Figs. 149, 152D

RANGE. Extreme northern Cape York Peninsula. RECOGNITION. Body color pale yellow-brown or

brown. Top of pronotum and head with small dark markings and cells of FW distinctly darker than veins (Fig. 149C). Face with dark line running across face and between lower front corners of eyes; line then bends ventrally and runs laterally across genae to back of head (Fig. 153A). Clypeus with two lateral dark markings. Base of mandible with dark mark. Frons with two parallel, vertical dark marks between antennae. Trace of external tympanal opening evident. Holotype measurements: Body length 7.75 mm (11.67 to end of HW's); femur III 5.8 mm; cerci 5.2 mm.

HOLOTYPE. ♂, A-45-46, forest near Portland Roads, Cape York, QLD, 11 viii 1968, ANC.

HABITAT. On foliage in forest and forest edges.

SPECIMENS. Holotype ♂ ANC. Lockerbie, Cape York, QLD, 6-15 vi 1969 (Monteith) 3♂ 4♀ UQC.

NILARIUS GROUP

Known only from females. Body color uniformly medium brown to pale yellow-brown. Legs lacking stripes or small dark spots. The only two species in this group are each represented solely by the holotype female.

nilarius

Body color yellowish; antennae with intermittent dark rings.

minmirri

Body color brown; antennae without dark rings.

Amusurgus nilarius n. sp., Figs. 150, 153PX, 154K

RANGE. Extreme northern NT and Cape York.

RECOGNITION. Females: Males unknown. Body color entirely pale yellow-brown without dark spots. Antennae have intermittent dark rings unlike *A. minmirri*. Head entirely pale yellow-brown. Eyes pale. Fifth segment of maxillary palpi broadly expanded distally (Fig. 153X). FW's same color as head and pronotum; veins and cells same in color. HW's extending beyond cerci and exposed portion more than half the FW length. Legs without dark spots. Ovipositor as in Fig. 153P. Holotype measurements: Head 1.04 times as wide as middle pronotal width. FW 5.05 times as long as pronotum and 0.98 times as long as femur III. Femur III 1.02 times as long as tibia III. Ovipositor 0.42 times as long as femur III. Body length 5.7 mm (10 mm to end of HW); FW length 4.6 mm; femur III 4.9 mm; cerci 3.8 mm; ovipositor 2.04 mm.

HOLOTYPE. ♂, Jardine River, Cape York, QLD, 15-17 vi 1969 (Monteith) UQC.

HABITAT. Not known.

SPECIMENS. Holotype ♀ UQC. 11.07S 132.08E, Smith Point, Cobourg Pen., NT, 17 i 1977 (Farrow) 1♀ ANC.

Amusurgus minmirri n. sp., Fig. 153QV

RANGE. Type locality in eastern mountains of northcentral QLD.

RECOGNITION. Females: Differs from *A. nilarius* in having body color more brown than yellow, wing veins distinctly lighter than wing membrane, and lacking dark rings on antennae. Body color medium brown. Face, legs, and pronotum uniformly medium brown. Veins of FW lighter than cells, HW's extending well beyond end of ovipositor; exposed portion about half as long as FW. Maxillary palpi as in Fig. 153V. Ovipositor as in Fig. 153Q. Holotype measurements: FW 1.02 times as long as femur III and 4.55 times as long as pronotum. Femur III 1.02 times as long as tibia III. Body length 5.8 mm to end of abdomen, 10.7 mm to end of HW; femur III 5.0 mm; ovipositor 2.1 mm.

HOLOTYPE. ♀, 11 miles south of Ravenshoe, QLD, 2700 feet, 20 iii 1964 (Common, Upton) ANC.

HABITAT. Rain forest.

SPECIMENS. Holotype ♀ ANC.

Noorundi Group

Pale green or yellowish insects. Tibiae I and II with two small black spots near base. Tibia III with single black spot near base. The two species in this group can be separated by their genitalia.

Amusurgus noorundi n. sp., Figs. 152C, 153DFS, 154BC

RANGE. Rain forest of northcentral coastal QLD.

RECOGNITION. Males: Pale yellow to pale green. Top of head sometimes with faint darker bands on back of head (Fig. 153F). Tibia I with two inner dark spots in first quarter (Fig. 154BC) and tibia II with similar spots on outer face. Head flattened on top (Fig. 153D). Cells of FW darker than veins. Rectangular cells of HW brownish dorsally. All studied specimens macropterous. Middle tarsal segment brown. Male genitalia as in Fig. 152C. Holotype measurements: Body length 7.75 mm; femur III 6.67 mm; cerci 5.33 mm.

HOLOTYPE. ♂, West slope of Seymour Range, Dinner Creek Road, near Innisfail, QLD, rain forest, under bark, 3 xi 1966 (Britton) ANC.

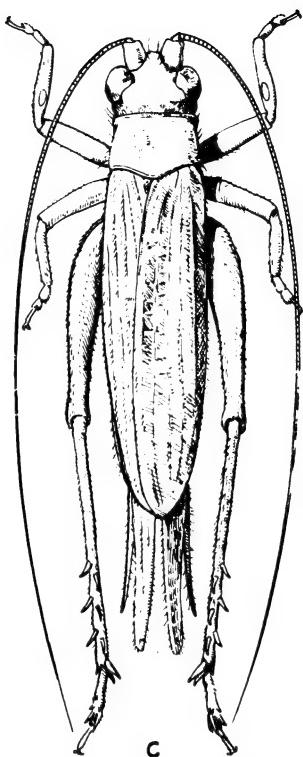


FIG. 155. *Metiochodes australicus* male.

HABITAT. Rain forests. Britton found holotype hiding under bark.

SPECIMENS. Holotype ♂ ANC. Mossman Gorge, N QLD, 23 iv 1967 (Colless) ♂ ANC. Kuranda Range State Forest, QLD, 20 iv 1967 (Colless) ♂ ANC.

Amusurgus hackeri (Chopard), Figs. 150, 152E, 153R, 154DELM

Metiochodes hackeri Chopard 1951: 447. Holotype ♀, Dunk Island, QLD, 1927 (H. Hacker) QM. Type examined.

RANGE. Northcentral coastal QLD.

RECOGNITION. Very similar to *A. noorundi*. Genitalia as in Fig. 152E. Body pale green in life. Tibiae I and II with two proximal dark spots (Figs. 154DE). Femur II with one distal dark spot (this spot not obvious in *A. noorundi*). Veins of FW more pale than cells. Male genitalia symmetrical—those of *A. noorundi* slightly asymmetrical. Tibia III with one small dark spot on posterior face near base (Fig. 154L). Macropterous. Body length of ex-

ample ♂ 7.25 mm (11.2 to end of HW); femur III 5.17 mm; cerci 4.25 mm.

HABITAT. Forests and forest edges.

SPECIMENS. Holotype ♀ QM. A-27 1♀ ANC. A-37 1♂ ANC.

Genus METIOCHODES Chopard

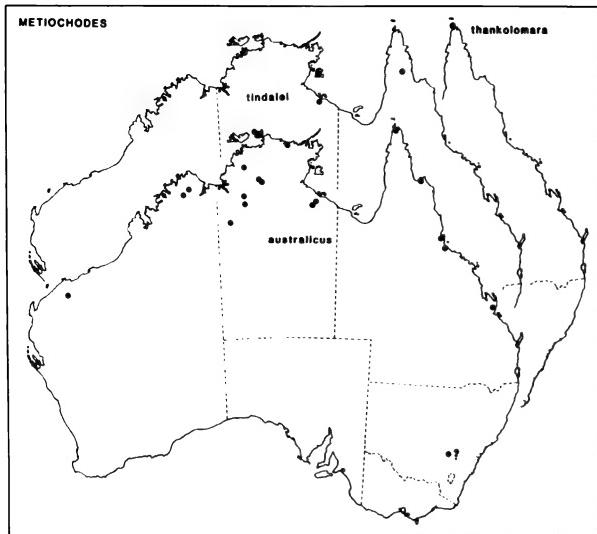
Metiochodes Chopard 1931: 13. Type species: *Metiochodes flavescentes* Chopard 1931: 13, Singapore, by original designation. The type species is listed from Borneo, Sumatra, N. Palawan and Queensland (Chopard 1968: 337).

Chopard (1937: 115) lists a male of *Metiochodes flavescentes* Chopard (1931: 13: Borneo?) among material collected by Handschin at Burnside, Australia, April 1931. In 1968 Chopard (p. 337) repeats this record, although he omitted it from his 1931 treatment of Australian Gryllidae. Handschin's material is at Basel, but we have not seen the specimen involved. Because we consider it unlikely that a species of this kind from Borneo occurs also in Australia, we have not included *flavescentes* in our keys or discussions.

This genus includes 11 known species, three in Australia, one in Africa, and the rest extending from Ceylon through the Indomalaysian region to New Guinea. Both sexes have large inner tympana and may occasionally have very small outer ones. The genus is close to *Amusurgus* but differs in genitalic configuration. On the basis of the genitalia we have placed *Metiochodes hackeri* Chopard under *Amusurgus*.

RECOGNITION. Males lack stridulum. FW venation similar in both sexes. Body color pale green or yellowish and without any dark spots. Inner tympanum very large, outer one obsolete or represented by shallow dimple, or very small. Abdomen with dorsal gland. Head flat on top and almost forming right angle in lateral profile (Fig. 157K). Top of head with pale, not very prominent bristles. Scape of antenna very wide relative to rostrum (Fig. 157E). Genitalia usually asymmetrical. Differs from *Amusurgus* in shape of genitalia, in having flat head, and in lacking dark markings on body. Similar to *Amusurgus* in having pubescent FW veins and in lacking male stridulum.

Females difficult to distinguish from *Cyrtotixiphoides* except by association with males.

FIG. 156. *Metiochodes* distributions.*tindalei*

1. Male genitalia as in Fig. 157B.
2. Male with dark band through eye (side view).
3. Male femur III length less than 4.5 mm.
4. Ovipositor 2.75 times pronotum length; ovipositor length ca. 2.9 mm (based on single female from Stewart Range, QLD, only presumed to belong to this species).

australicus

1. Male genitalia as in Fig. 157A.
2. Male without dark band through eye (side view).
3. Male femur III length more than 4.5 mm.
4. Ovipositor 1.6–1.7 times as long as pronotum ($n=12$); ovipositor length 2.0–2.3 mm.

thankolomara

1. Male genitalia as in Fig. 157C.
2. Male without dark band through eye.
3. Male femur III length less than 4.5 mm.
4. Ovipositor 1.67 times as long as pronotum ($n=1$); ovipositor length ca. 1.8 mm.

***Metiochodes tindalei* Chopard, Fig. 157BFJKL**

Metiochodes tindalei Chopard 1951: 479. Holotype ♀, Groot Eylandt (N. B. Tindale) SAM. Type examined.

RANGE. Northern NT and possibly northern Cape York.

RECOGNITION. Males: Pale green to pale yellowish-white. Differing from *M. australicus* and *M. thankolomara* mainly in having dark band through eye, genitalic configuration (Fig. 157B), and shape of maxillary palpi (Fig. 157J). Femur III length 4.3 mm in both males (from 4.7 to 5.9 mm in *M. aus-*

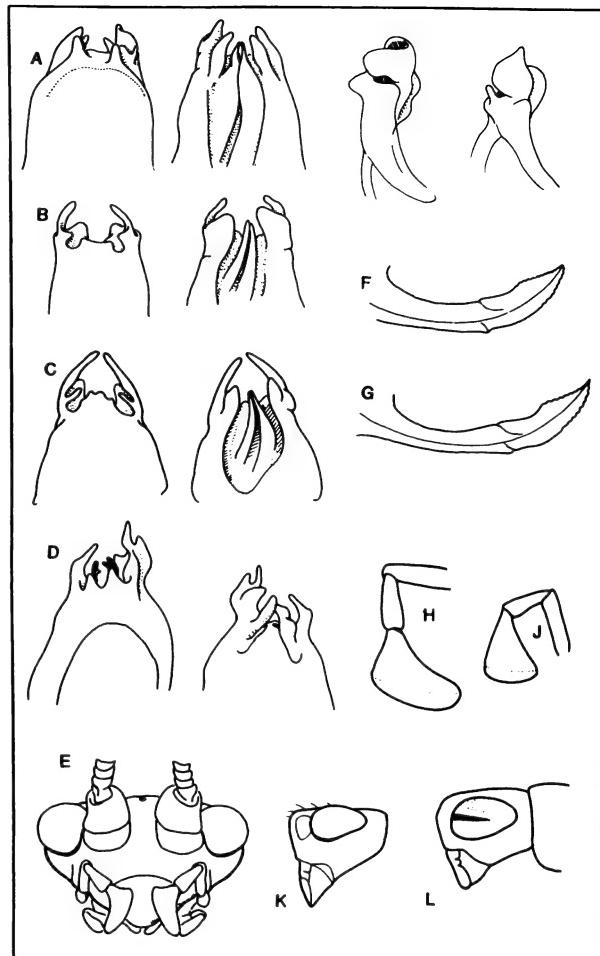


FIG. 157. *Metiochodes*. A–D, male genitalia: A, *australicus*, dorsal, ventral, lateral (Millstream HS WA), lateral (Yeppoon QLD); B, *tindalei*; C, *thankolomara*; D, *flavescens* from Borneo (Chopard det. specimen). E, face of *australicus*; F, *tindalei* holotype ovipositor; G, *australicus* max. palp; holotype ovipositor; H, *australicus* max. palp; J, *tindalei* max. palp; K, *tindalei* ♂ A-130; L, *tindalei* near Borroloola.

tralicus; ca. 4.4 mm in *M. thankolomara*). FW ca. 6.5 times as long as pronotum and 1.25 times as long as femur III. Both males with very long HW's. Femur III about 1.05 times as long as tibia III. Body length ca. 7.0 mm; cerci ca. 3.1 mm.

Females: Females do not possess band through eye. Not collected with males and may represent different species. Ovipositor 2.8–3.0 mm long (less than 2.5 in other two species). Ovipositor more than 2.5 times as long as pronotum (less than 1.8 times

as long in other species). Female from Stewart Range, Cape York, may belong to this species.

HABITAT. Probably mainly forest and forest edges.

SPECIMENS. Holotype ♀ SAM, A-130 2♂ ANC. 15.85S 136.21E, 12 km NNE Borroloola, 1 xi 1975 (Upton) 1♂ ANC. QUEENSLAND: Cape York, Stewart Range, 500 m, 29 iv to 3 v 1961 (Gressitt) 1♀ BISH.

Metiochodes australicus Chopard, Figs. 155, 157AEGH

Metiochodes australicus Chopard 1951. Holotype ♀, Bathurst Head, QLD, Jan 1927 (Hale, Tindale) SAM. Examined.

RANGE. Northern WA, NT, and eastern coastal QLD.

RECOGNITION. Males: Pale green to pale yellowish-white. Very similar to *M. tindalei* and *M. thankolomara*. Differing from both species in genitalia (Fig. 157A), body size (femur III 4.7–5.9 mm), and shape of maxillary palpi (Fig. 157H). Scape almost twice as wide as frons. Top of head flat, slightly concave; with transverse depression running between eyes. Body length 7–8 mm. Ovipositor 1.55–1.61 times as long as pronotum (n=3). Holotype measurements: Macropterous. Head ca. 1.10 times as wide as middle of pronotum. FW ca. 5.3 times as long as pronotum and 1.34 times as long as femur III. Femur III ca. 1.04 times as long as tibia III. Body length ca. 8.91 mm (ca. 13 mm to end of HW).

Females: Same color and size as males. Femur III 4.8–5.3 mm long. Ovipositor 1.57–1.70 times as long as pronotum ($\bar{x}=1.66$, n=12) and 0.40–0.43 times as long as femur III ($\bar{x}=0.42$, n=7).

HOLOTYPE. ♂, Yeppoon, QLD, 27 xii 1964 (I. F. B. Common) ANC.

HABITAT. Mesic forests. Sometimes collected at lights.

SPECIMENS. Holotype ♀ SAM. WESTERN AUSTRALIA: 21.35S 117.04E, 0.5 mi WNW Millstream HS, 14 iv 1971 (Upton, Mitchell) 1♂ ANC. 15.19S 126.32E, Old Doongan, Kimberley dist, 3–8 viii 1975 (Common, Upton) 1♂ ANC. 15.02S 126.55E, Drysdale R, Kimberley dist, 3–8 viii 1975 (Common, Upton) 1♀ ANC. NORTHERN TERRITORY: near Borroloola, 29 x 1975 (Upton) 1♀ ANC. 16.10S 136.15E, Goose Lagoon, 11 km SSW Borroloola, 31 x 1975 (Upton) 1♀ ANC. 16.25S 136.05E, Surprise Ck, 45 km SSW of Borroloola, 5 xi 1975 (Upton) 1♀ ANC. 15.34S 130.54E, 4 mi SW of Coolibah HS, 24 vi 1968 (Mendum) 1♀ ANC. 17.38S 130.00E, 28 mi ENE Inverway HS, 17 viii 1969 (Mendum) ANC. Maningarda, Arnhem Land, 23 iii 1961 (Gressitt) 2♂ BISH. 14.31S 132.22E, 8 mi ESE Katherine, 13 xii 1967 (Ve-

stjens) 1♀ ANC. Burrell's Creek, Stuart Highway, 24 xi 1972 (Colless) 1♀ ANC. 11.09S 132.09E, Black Point, Cobourg Pen., 13 ii 1977 (Lewis, Barrett) 1♀ ANC. 11.07S 139.08E, Smith Point, Cobourg Pen., 31 i 1977 (Bakker) 1♂ ANC. Katherine, 17 viii 1973 (Kelsey) 2♂ 1♀ ANC. 8 km ENE Victoria River Downs, 11 viii 1973 (Kelsey) 1♂ ANC. QUEENSLAND: Yeppoon, 27 xii 1964 (Common) 1♂ ANC. 4 mi SSE Yeppoon, 5 ii 1970 (Common) 1♀ ANC. 2 mi ENE Rollingstone, 26 iv 1969 (Common, Upton) 1♀ ANC. Forest Beach, 12 mi E Ingham, 16 v 1961 (Straatman) 1♀ ANC. Lockerbie, Cape York, 10–15 vi 1969 (Monteith) 2♀ uqc. NEW SOUTH WALES: Cowra, 16 iii 1963 (Lossin) 1♀ AM.

Metiochodes thankolomara n. sp., Fig. 157C

RANGE. Type locality on islands north of Cape York Peninsula.

RECOGNITION. Males: Body color in preserved specimens very pale brown or straw-colored. Color in life not known, probably pale green. Macropterous. Very similar to other *Metiochodes* but differing in genitalia (Fig. 157C). Maxillary palpi as in *M. tindalei* (Fig. 157J). Body length 7–9 mm (ca. 11 mm to end of HW's). Holotype measurements: Body length 7 mm; FW length ca. 6 mm; femur III 4.7 mm; cerci broken.

HOLOTYPE. ♂, Prince of Wales Island, Cape York Islands, Australia, 8 iii 1920 (J. A. Kusche) ANC.

HABITAT. Not known, collected at lights.

SPECIMENS. Holotype ♂ ANC. Same data as holotype 1♀ ANC.

Genus CYRTOXIPHOIDES Chopard

Cyrtoxiphoides Chopard 1951: 473. Type species: *C. leai* Chopard 1951: 473, by original designation.

Seven species are included in the genus; two of them from Queensland. The remaining species are from Samoa, Ceylon, and West Africa.

RECOGNITION. Fig. 158. Males possess stridulum and very narrow mirror. Both sexes have large inner tympana and lack outer tympana. Head flattened on top and scape wide, as in *Metiochodes*. Body color pale green to yellow-white and without dark spots. Top of abdomen with dorsal gland. Differs from Australian *Anaxipha* in auditory tympana; latter genus always has large outer tympana (in addition to usual well-developed inner tympana).

planifrons

1. Top, lateral edges of frontal rostrum with distinct flanges.
2. Fifth segment of maxillary palpi boot-shaped (Fig. 160D).

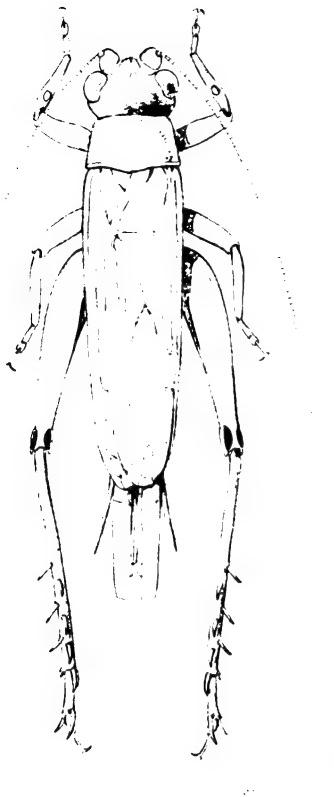


FIG. 158. *Cyrtoxiphoides planifrons* male.

- 3. Male FW venation as in Fig. 160C.
- 4. Male genitalia as in Fig. 160A.

leai

- 1. Rostrum without lateral flanges.
- 2. Fifth segment of maxillary palpi more triangular than boot-shaped.
- 3. Venation not as in Fig. 160C.
- 4. Male genitalia as in Fig. 160B.

Cyrtoxiphoides leai Chopard, Fig. 160B

Cyrtoxiphoides leai Chopard 1951: 473. Holotype ♀, Cairns District, QLD, SAM. Type examined.

RANGE. Type locality in northcentral coastal QLD.

RECOGNITION. Very similar to *C. planifrons* but differing in genitalia (Fig. 160B) and wing venation. Holotype has following measurements: Body length

ca. 5.5 mm (9.0 mm to end of HW); femur III 4.8 mm; FW length 4.8 mm; ovipositor 3.2 mm; ovipositor 0.67 times as long as femur III.

HABITAT. Rain forests.

SPECIMENS. Holotype ♀ SAM.

Cyrtoxiphoides planifrons Chopard, Figs. 158, 160ACD

Cyrtoxiphoides planifrons Chopard 1951: 474. Holotype ♀, Dunk Island, QLD, Aug. 1927 (Hacker) QM. Examined.

RANGE. Northcentral coastal QLD.

RECOGNITION. Very similar to *C. leai* but differing in genitalia and wing venation. Body color pale green in life. FW venation as in Fig. 160C. Differs from *Metiochodes* in having stridulum in male, and in genitalia. File with ca. 60 teeth. Chopard (1951) notes that, though similar to *leai*, "... this species is easily distinguished by the longer elytra with more regular veins, the strongly securiform apical segment of maxillary palpi." Ovipositor of holotype 0.58 times as long as femur III. Male from A-34 had FW 4.77 times as long as pronotum and 1.31 times as long as tibia III, file with ca. 60 teeth, body length 6.7 mm, femur III length 4.25 mm.

HABITAT. We collected a male in dense vegetation along the Daintree River.

SPECIMENS. Holotype ♀ QM. A-34 1♂ ANC.

Genus ANAXIPHA Saussure

Anaxipha Saussure 1874: 370. Type species: *Acheta exigua* Say 1825: 309. Mexico (according to Chopard 1968).

Anaxipha is one of the very large and essentially world-wide genera of Gryllidae; Chopard (1968) lists 103 species. Genitalic comparisons indicate that Australian and New World material is very similar.

Six Australian species of *Anaxipha* are known, two of them are new. Some species live in swampy or moist localities on emergent vegetation such as cattails (*Typha* spp.) and various reeds and rushes; others occur in drier habitats (*A. tetyenna*).

The classification of Trigonidiinae seems rather incomplete at the generic level and it is difficult to distinguish between the genera *Anaxipha* and *Paratrigonidium*, using Chopard's key. Chopard (1969: 284) notes: "This genus is very close to An-

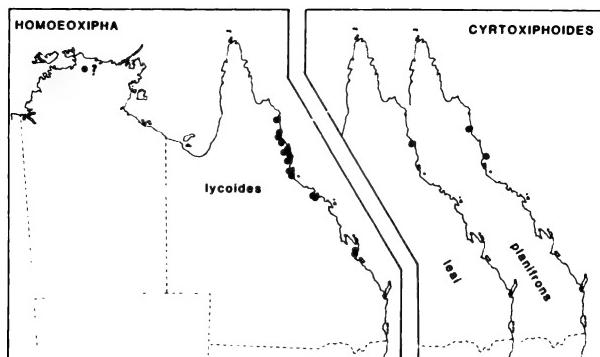


FIG. 159. *Cyrtotrophoides* and *Homoeoxiphia* distributions.

axiphia and rather badly defined; the principal character given by Brunner consists of the structure of the elytra which are membranous in the males, corneous, convex, with plain, longitudinal veins in the females. The species of this genus are often more vividly colored than in *Anaxiphia*."

RECOGNITION. (Australian species.) Body color variable. Males with stridulum. Auditory tympana variable—always with large outer tympanum and sometimes with large inner tympanum as well. Wing venation as in Fig. 165A–F.

Fuscocinctum Group

1. Tibia I with an outer tympanum.
2. Mirror not containing false mirror (Fig. 165A).
3. Top of head rounded (Fig. 165H).
4. Legs green; dorsum of abdomen black; disk of pronotum reddish-brown; antennae black in basal fifth.

Tetyenna Group

1. Tibia I with outer tympanum.
2. Mirror not containing false mirror (Fig. 165E).
3. Top of head rounded (Fig. 165J).
4. Legs, etc. not as above; body color not as below.

Anaxiphoides Group

1. Usually with inner and outer tympana; rarely with only outer tympanum.
2. Mirror contains false mirror (Fig. 165B).
3. Top of head flat (Fig. 165E).
4. Legs not green; body color very pale straw-colored or pale green.

ANAXIPHOIDES GROUP

Pale yellow-white insects. Tympana present on both inner and outer faces. False mirror within mirror proper (Fig. 165B). HW's in both sexes usually extending beyond end of abdomen. Top of head flattened as in Fig. 165G. Dorsum of abdomen with dorsal glands (as in Fig. 170N) hidden beneath wings. Live at margins of swamps and rivers.

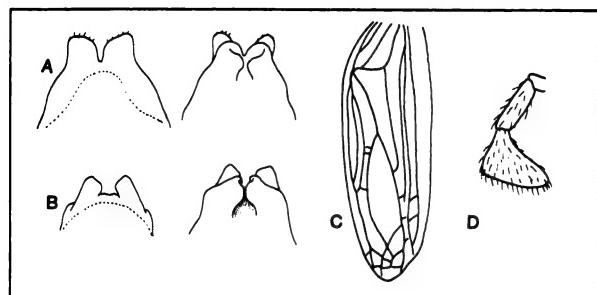


FIG. 160. *Cyrtotrophoides*. A, *planifrons* ♂ genitalia; B, *leai* ♂ genitalia; C, *planifrons* ♂ FW; D, *planifrons* max. palp.

anaxiphoides

1. Inner subapical spurs short (Fig. 165K).
2. A/B (see Fig. 165M) = 0.75–0.91.
3. A/C (see Fig. 165M) = 0.75–0.95.
4. File with 72–81 teeth (n=5).
5. Inner tympanum well-developed.
6. Mirror length ca. 2.0 times mirror width.

mjöbergi

1. Inner subapical spurs very long (Fig. 165M).
2. A/B = 1.3–1.8.
3. A/C = 1.2–1.7.
4. File with 99–104 teeth (n=2).
5. Inner tympanum well-developed.
6. Mirror length less than 2.0 times mirror width.

longipennis

1. Inner subapical spurs intermediate in length (Fig. 165L).
2. A/B = 1.0–1.4.
3. A/C = 0.9–1.3.
4. File with 61–73 teeth (n=4).
5. Inner tympanum sometimes absent.
6. Mirror length less than 2.0 times mirror width.

Anaxiphia anaxiphoides (Chopard), Figs. 161, 164E, 165CGKQT

Cyrtotrophida anaxiphoides Chopard 1925: 43. Holotype ♂, Bellenden Ker, QLD (Mjöberg) SM. Type examined. Transferred to *Anaxiphia* by Chopard 1951: 466.

RANGE. Northern NT to eastern coastal QLD.

RECOGNITION. Body color pale green in life; whitish in preserved specimens. Mirror in males about twice as long as wide. Mirror with circular false vein. Tibia I with well-developed inner and outer tympana. Genitalia asymmetrical (Fig. 164E). File with 72–81 teeth (n=5). Inner subapical spurs on tibia III relatively short: A/B, 0.75–0.91; A/C, 0.75–0.95 (see Fig. 165M for dimensions A, B, C). HW's usually extending well beyond abdomen in both sexes, but two females from Bamaga, QLD, which we believe belong to this species have concealed HW's. FW ca. 5.3 times as long as pronotum, and

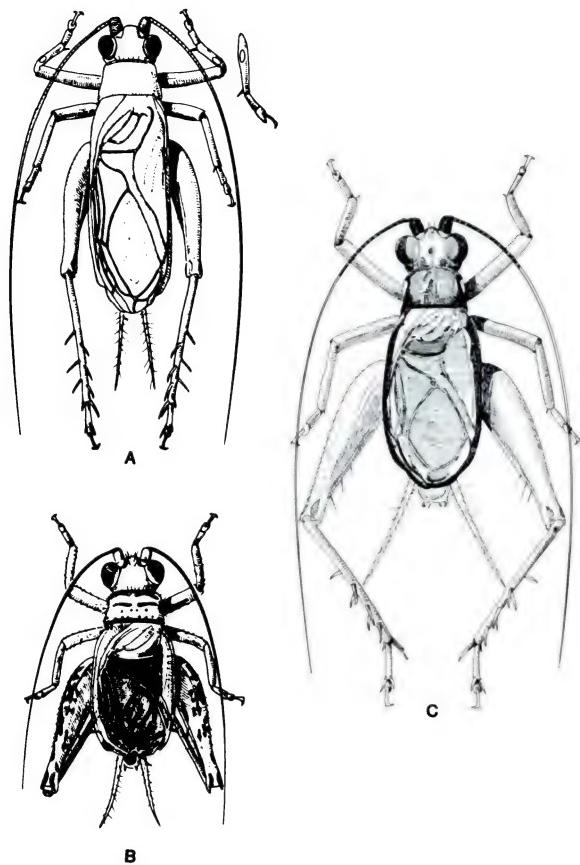


FIG. 161. *Anaxipha*. A, *anaxiphoides*; B, *tetyenna*; C, *fuscocinctum*.

ca. 1.27 times as long as femur III. Femur III ca. 1.1 times as long as tibia III. Ovipositor ca. 1.6 times as long as pronotum. Body length ca. 6–7 mm; femur III ca. 4 mm; cerci ca. 3.3 mm.

SONG. Fig. 163. Males sing at night. A succession of short trills. Along the Herbert River (A-20) the song was recorded in tall grass and groups of individuals seemed to be synchronizing. Only a female was collected at this locality; therefore the source of the song remains in some doubt. At the Barron River individuals were not synchronizing their songs.

	p/s	p/tr	tr/s	kps	°C
A-58	65–67	34–41	0.61	5.3	21
A-20	56.6	39	0.65	4.7	21
A-293	66.7	34	0.60	4.8	18

HABITAT. Collected by sweeping in tall, green

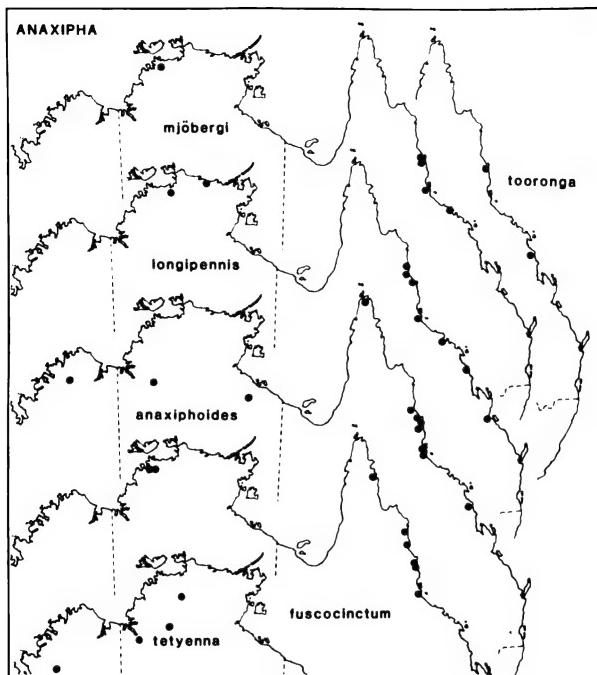


FIG. 162. *Anaxipha* distributions.

grasses and rushes near streams. Singing in dry grass near Barron River.

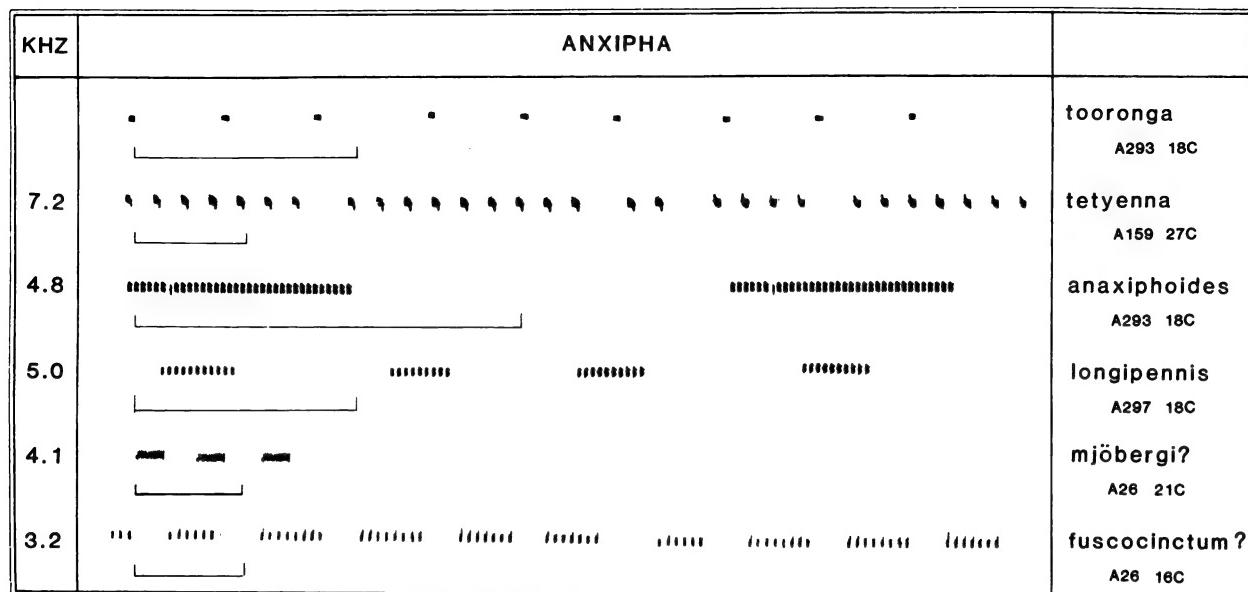
SPECIMENS. Holotype ♂ SM. QUEENSLAND: A-26 1♂ ANSP. A-58 1♂ ANC. A-293 6♂ 1♀ ANC. Cardstone, Tully Falls, 23 i 1965 (Brooks) 1♂ ANC. Mt. Bartle Frere, east base, 24 iv 1955 (Norris, Common) Edge Hill, Cairns, 7 iii 1965 (Brooks) 2♂ 1♀ ANC. Barron Falls, near Kuranda, 12 xii 1964 (Brooks) 2♂ 1♀ ANC. 3 mi N Kuranda, 24 iv 1955 (Norris, Common) 1♀ ANC. 4 mi W Babinda, 10 iii 1964 (Common, Upton) 4♀ ANC. Ingham, 3 v 1961 (Stratman) 1♀ ANC. Mossman, 25 iii 1967 (Upton) 1♀ ANC. Hambledon, xi 1921 (Pemberton) 1♂ 1♀ ANC, 1♂ BISH. Bamaga, Cape York, 3 vi 1969 (Monteith) 2♀ UQC. NORTHERN TERRITORY: 4 mi SW Coolibah HS, 15.34S 130.54E, 24 v 1968 (Mendum) 1♀ ANC. 16.08S 136.06E, 22 km WSW Borroloola, 16 iv 1976 (Key et al.) 1♀ ANC. 15.19S 126.32E, Old Doongan, Kimberley distr., 2 viii 1975 (Common, Upton) 1♀ ANC.

Anaxipha mjöbergi Chopard, Figs. 164D, 165DM

Anaxipha mjöbergi Chopard 1925: 40. Holotype ♂, Bellenden Ker, QLD (Mjöberg) SM. Type examined.

RANGE. Northern NT and eastern coastal QLD.

RECOGNITION. Inner subapical spurs of tibia III much longer than in *A. anaxiphoides* or *A. longipennis*: A/B, 1.24–1.72; A/C, 1.26–1.64 (Fig. 165M). File with 99–104 teeth (n=2). Mirror length less than twice mirror width. Genitalia similar to *A. longipennis* (Fig. 164D). Body length ca. 6–7 mm, fe-

FIG. 163. *Anaxipha* songs. Scale = 0.5 s.

mur III length ca. 4.7 mm; cerci ca. 3.4 mm. Inner and outer tympana well developed with outer one slightly larger.

SONG. Short trill with fast pulse rate. We are uncertain which song shown in Fig. 163 belongs to this species.

HABITAT. Two males collected along road in cleared rain forest.

SPECIMENS. Holotype ♂ sm. QUEENSLAND: A-26 2♂ ANC. Cairns, 19 viii 1966 (Huggins) 1♂ BM. Gordonvale (Illingworth) 2♂ 1♀ BISH. Ingham, 29 iii 1961 (Harley) 1♀ ANC. Ayr, 4 ix 1950 (Riek) 1♀ ANC. NORTHERN TERRITORY: Humpty Doo, 29 vii 1959 (Boerema) 1♀ ANC.

Anaxipha longipennis (Serville), Figs. 164C, 165BLN

Trigonidium longipennis Serville 1839. Type ♀, Isle St. Maurice (Guerin Collection) GM. *Anaxipha longipennis*, Chopard 1951. Type examined.

RANGE. Northern NT and eastern coastal QLD.

RECOGNITION. Very similar to *A. anaxiphoides* but genitalia different, and mirror not twice as long as wide. Inner subapical spurs of tibia III intermediate in length (Fig. 165M): A/B 1.00–1.45; A/C 0.96–1.25. Inner tympanum may be absent (A-34) or well developed (A-141, A-20). Body length 5.8–7.3 mm. File with 71–72 teeth (n=2). Holotype measurements: File with 72 teeth. Head 1.09 times as wide as front of pronotum. FW 4.06 times as long as pronotum and 1.02 times as long as femur III.

Femur III 1.12 times as long as tibia III. Body length 5.8 mm; FW length 3.9 mm; femur III 3.83 mm; cerci 3.2 mm.

HOLOTYPE. ♂, A-141, Adelaide River, east of Darwin, NT, 26 ix 1968, ANC.

SONG. Fig. 163. Chirps at 2.1 to 3.1 ch/s.

	p/s	ch/s	p/ch	kps	°C
A-34	70	2.2	10–11	5.4	23
A-297	63.2	2.1	10	5.0	18
A-299	76	2.8	10	5.3	18
A-141	92.6	3.1	11–12	6.0	22

HABITAT. Tall herbaceous vegetation along rivers and forest edges.

SPECIMENS. Holotype ♂ ANC. A-17 1♂ ANC. A-20 1♀ ANSP. A-34 4♂ ANC. A-141 1♂ ANSP. QUEENSLAND: Ingham, ii, iii, iv, ix, 8♂ 10♀ ANC. Mossman, 25 iii 1967 (Upton) 2♂ ANC. Ayr, 4 x 1950 (Riek) 1♂ ANC. Cardstone, Tully Falls, 23 i 1965 (Brooks) 1♀ ANC. Kuranda, 13 iii 1956 (Gressitt) 1♀ BISH. NORTHERN TERRITORY: Maningrida, Arnhem Land, 16 iii 1961 (Gressitt) 1♀ BISH.

TETYENNA GROUP

Tibia I with only an outer tympanum. Top of head not flat as in *Anaxiphoides* Group. FW without false mirror. Antennae not black in basal segments. HW's not visible. Live in open, drier situations than *Anaxiphoides* Group.

tetyenna

1. Body with large or small dark markings or spots.
2. File with more than 140 teeth.
3. Male genitalia as in Fig. 164A.
4. Northern Territory.

tooronga

1. Body color entirely pale yellowish and without dark bands or spots.
2. File with ca. 112 teeth.
3. Male genitalia as in Fig. 164B.
4. Queensland.

***Anaxipha tetyenna* n. sp., Figs. 161, 164A, 165EJP**

RANGE. Northern NT and possibly northeastern WA.

RECOGNITION. Males: Body color tan with mottled brown markings. Labrum and clypeus pale. Frons with two parallel brown streaks between bases of antennae and with short brown streak above base of each mandible. Top of head yellowish with prominent bristles between eyes and on rostrum. Eyes grey. Lateral margins of rostrum brown. Antennae light brown to tan; darker segments separated by about 5 lighter segments proximally. Disk of pronotum tan, but anterior and posterior margins brown (Fig. 165J); central portion with two transverse brown markings (Fig. 161B). Area surrounding bases of bristles brown (bristles removed). Lateral lobes of pronotum as in Fig. 165J. FW's with pale veins and light brown membrane. Lateral field mostly pale and transparent. Mirror prominent, containing several circular light lines. Venation as in Fig. 165E. File with 226 file teeth ($n=1$). Legs I and II pale. Tympanum external, large, oval. Femur III pale, mottled with brown (Fig. 165P). Tergum light brown except for 10th tergite which is pale. Supragenital portion brown. Sternum: last 2 segments from end have pale central portions. Cerci pale with very prominent clubbed hairs. Genitalia as in Fig. 164A. Holotype measurements: FW 4.22 times as long as pronotum and 0.89 times as long as femur III. Femur III as long as tibia III. Body length 4.9 mm; femur III 3.4 mm; cerci ca. 2.0 mm (tip broken).

HOLOTYPE. ♂, A-159, 50 miles southwest of Cooinda, northeast of Pine Creek, NT, 28 ix 1968, ANC.

SONG. Fig. 163. Irregularly broken trill with pulse rate of 7.8 p/s at 81°F. Pulse long. Taped at A-159,

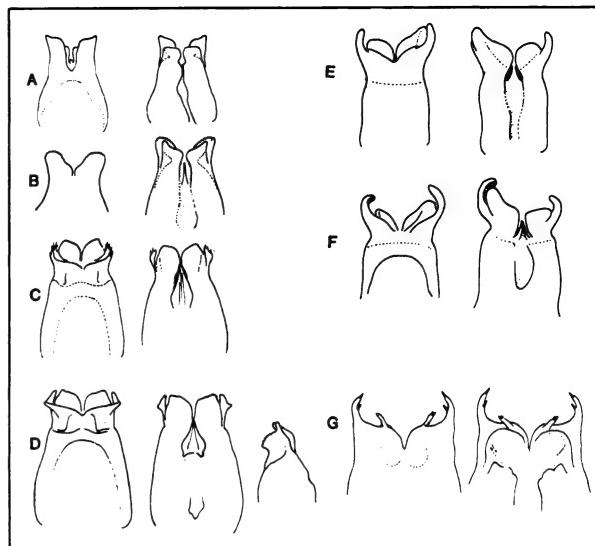


FIG. 164. *Anaxipha* male genitalia. A, *tetyenna* A-159; B, *tooronga*; C, *longipennis*; D, *mjöbergi*; E, *anaxiphoides* A-293; F, *longipennis* Kuala Lumpur; G, *fuscocinctum* A-26.

A-166. Similar song (11.8 p/s, 8.5 kps, 35°C) taped at A-798.

HABITAT. Found 2 to 3 feet above ground in dry grass about 50 m from spring. Others heard SW of Darwin in dry creek bed in same situation.

SPECIMENS. Holotype ♂ ANC.

LISTENING RECORDS. A-166, A-169.

***Anaxipha tooronga* n. sp., Figs. 164B, 165FR**

RANGE. Central coastal QLD.

RECOGNITION. Males: Body color pale brown, yellowish or straw colored. Face yellowish. Top of head yellowish with brownish mark centrally between eyes and with prominent brown bristles. Eyes dark grey. Antennae pale with dark rings. Basal antennal segment reddish. Maxillary palpi pale. Lateral lobes with prominent brown bristles. FW's pale brown, uniform in color. File with 112 file teeth ($n=1$). Legs pale with dark setae. Tympana small. Abdomen pale throughout, without dorsal gland. Cerci pale with dark setae. Genitalia as in Fig. 164B. Holotype measurements: FW 3.73 times as long as pronotum and 0.79 times as long as femur III. Femur III 1.05 times as long as tibia III. Body length 4.9 mm; femur III 3.67 mm; cerci ca. 2.25 mm.

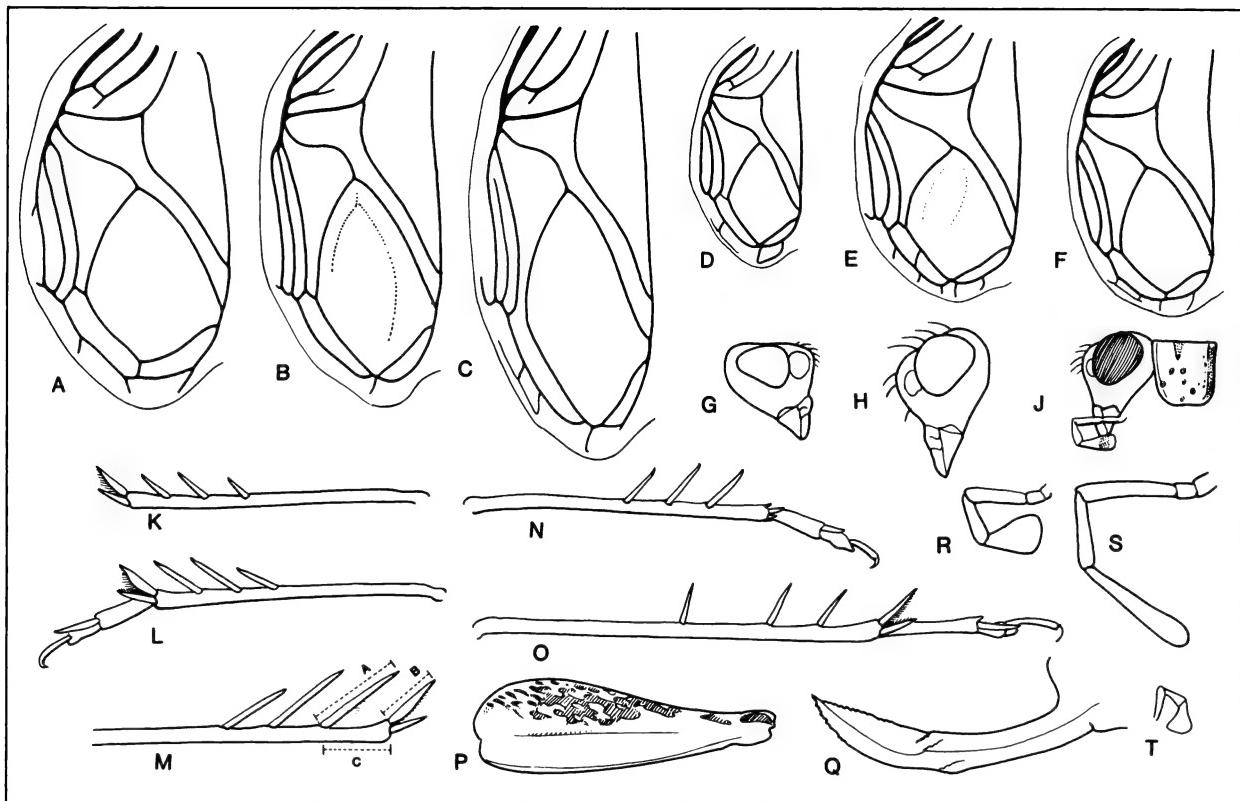


FIG. 165. *Anaxiphidae*. A, *fuscocinctum* A-26; B, *longipennis* A-17; C, *anaxiphoides* A-293; D, *mjöbergi* A-26; E, *tetyenna* holotype; F, *tooronga* holotype; G, *anaxiphoides* A-29; H, *fuscocinctum*; J, *tetyenna*; K, *anaxiphoides* inner; L, *longipennis* inner; M, *mjöbergi* inner; N, *longipennis* outer; O, *fuscocinctum* inner; P, *tetyenna* holotype; Q, *anaxiphoides* A-293; R, *tooronga* holotype max. palp; S, *fuscocinctum* max. palp; T, *anaxiphoides* max. palp.

Females: Same color as male. Body length to end of ovipositor 6.5 mm. Tympanum on outer face. Ovipositor 0.49 times as long as femur III and 1.83 times as long as pronotum.

HOLOTYPE. ♂, A-293, junction to Seaforth and Mt. Jukes, northeast of Mackay, QLD, 5 xi 1968, ANC.

SONG. Fig. 163. Group of pulses at 2.4/s at 65°F.

HABITAT. Collected in dry grass near sugar-cane field, 2-3 feet above ground.

SPECIMENS. Holotype ♂ ANC. Hambleton, QLD, 17.01S 145.44E, xi 1921 (Pemberton) 1♀ BISH.

FUSCOCINCTUM GROUP

The only member of this group, *A. fuscocinctum*, has but an outer tympanum; the mirror contains no false mirror (as in *A. longipennis* and *H. lycoides*, Figs. 165B, 166); the top of the head is rounded; the

legs are all bright green; the dorsum of the abdomen is black; and the disc of the abdomen is reddish brown.

Anaxiphida fuscocinctum (Chopard), Figs. 161, 164G, 165AHOS

Paratrigonidium fuscocinctum Chopard 1925: 41. Holotype ♂, Tjibodas, Java, 13 viii 1920, PM. Type examined.

RANGE. Extreme northern NT and northern coastal QLD.

RECOGNITION. Eyes iridescent green and all legs bright green in life. Antennae black in basal fifth, pale in remaining parts. Top of pronotum reddish becoming dark brown along posterior margin. Lateral lobes pale green in lower half, reddish-brown in upper half; sometimes reddish upper half becomes blackish along lower border. Top of abdomen black. Male FW largely transparent, with nar-

row dark brown border all around. Female FW's brown to shiny black and strongly convex. Both sexes micropterous. Lower half of eyes sometimes dark. Ovipositor about 2.0 times as long as pronotum. File with 90–106 file teeth ($n=3$). FW venation as in Fig. 165A. Cerci very pale. Maxillary palpi very slender. Male FW ca. 4.25 times as long as pronotum. Femur III ca. 1.02 times as long as tibia III. Body length 6–7 mm; cerci 3.5–4 mm.

SONG. Song in Fig. 163 may belong to this species.

HABITAT. Collected in herbaceous vegetation 3–4 feet above ground along rain forest by sweeping in late afternoon.

SPECIMENS. Holotype ♂ PM. A–26 ANC. A–23 ANC. QUEENSLAND: Gap Creek, 5 mi N of Bloomfield River, 8–9 v 1970 (Monteith) 1♂ uqc. Iron Range, Cape York, 1–9 vi 1971 (Monteith) 1♂ 1♀ uqc. Cooper Creek, 10 mi N Daintree R, 2 v 1970 (Monteith) 1♂ uqc. Hambledon, xi 1921 (Pemberton) 1♀ BISH. Gordonvale, 1♂ 1♀ BISH. NORTHERN TERRITORY: Berry Springs, 50 km SE Darwin, 12 iii 1961 (Gressitt) 1♀ BISH. Holmes Jungle, Palm Creek, 15 km NE Darwin, 14 iii 1961 (Gressitt) 2♀ BISH.

Genus **HOMOEOXIPHA** Saussure

Homoeoxiphia Saussure 1874: 363. Type species: *Phyllopalpus lycoides* Walker 1869: 71, Ceylon, by monotypy.

This genus includes twelve known species, four African, two Philippine, one New Guinean, four Australian, and one (*lycoides*) supposedly occurring in China, Formosa, Malaysia, Ceylon, Java, and Burma.

The type of *lycoides* (Ceylon—BM) may not be conspecific with any of the Australian crickets, but it closely resembles the most common species, so we have chosen to use the name *lycoides* until more evidence is gathered. This species may in fact extend more or less continuously across the Indo-malaysian region from India to Australia.

RECOGNITION. (Australia only.) Head narrower than pronotum, elongated and black (Figs. 166AB). Tibia I with large inner and outer tympana. Male FW with stridulum and large mirror. Dorsum of body with dorsal gland. Pronotum with rounded anterior margin (top view).

***Homoeoxiphia lycoides* (Walker), Figs. 166, 176HJK**

Phyllopalpus lycoides Walker 1869: 71. Holotype ♂, Ceylon, BM transferred to *Homoeoxiphia* by Chopard 1925: 40. Examined.

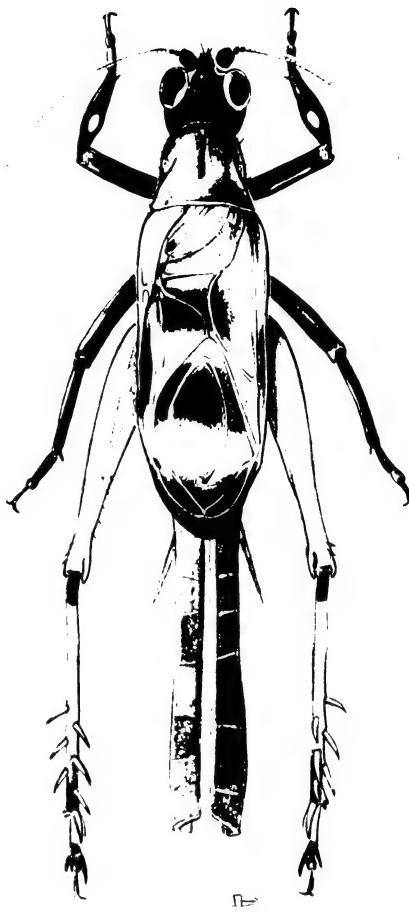
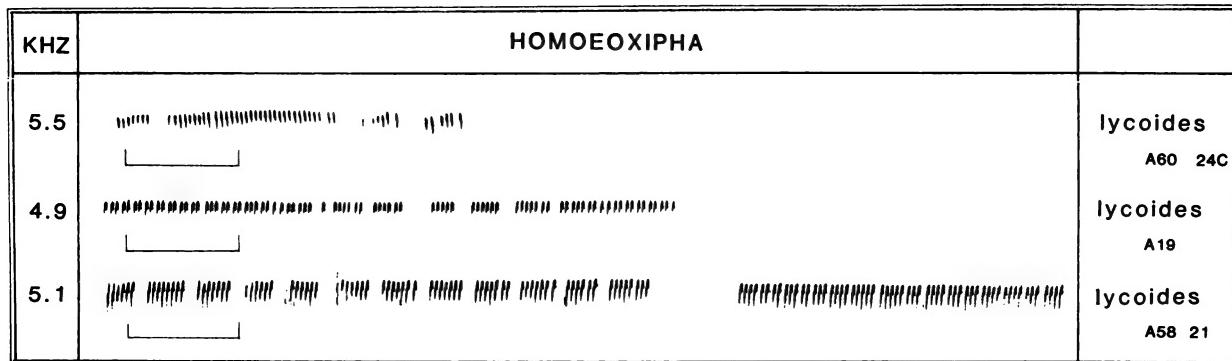


FIG. 166. *Homoeoxiphia lycoides* male.

RANGE. Northeastern coastal QLD and possibly northern NT.

RECOGNITION. Head dark brown. Palpi nearly black. Scape of antennae black. Pronotum reddish brown, much lighter than head. Head narrow. Lower anterior margin of lateral lobe of pronotum rounding gradually into anterior-dorsal margin. Legs I and II black; coxae and trochanters white. Legs III brown; darkest at distal ends of tibiae. Tibiae I with large tympana on inner and outer faces roughly equal in size. FW's with dark markings; darkest in region of chords and between medial portion of mirror and stridulatory vein. FW's extend beyond abdomen. File with 74–85 teeth. Cerci pale.

FIG. 167. *Homoeoxipha* songs. Scale = 0.5 s.

Abdominal tergites and sternites dark brown; intervening membrane pale. Genitalia as in Fig. 176HJ. Females similar to males in appearance (Fig. 166B). Either micropterous or macropterous.

SONG. Fig. 167. Rather seedy or coarse trill composed of paired and otherwise irregularly spaced pulses averaging 28–30/s. Sometimes males break trill into short chirps. In a cage, a courting male produced 2, 3–4-pulse non-muscial chirps, then a musical one, etc., after being touched by a female, and deleted the louder chirp after losing contact with the female. The calling song resembles that of North American *Phyllopalpus pulchellus*, and the species lives in similar places, though more commonly found in low herbage, within a foot or two of the ground. A male taped at Mission Beach was singing soft and loud chirps in pairs, the loud one following the soft one and having one or 2 more pulses (28/s) as follows: 6–8, 6–7, 5–6, 4–6, 4–7, 4–5. A male at Crystal Creek near Mt. Spec sang a smooth trill. The courtship song of this cricket has a loud unit that makes it louder than calling. The number of file teeth in this species varies from 75 to 83. The song is so variable that numerous males singing simultaneously give the impression that several species are singing.

HABITAT. Most easily secured by sweeping close to ground or, when dense colonies are located, by searching, particularly at night. Males sing at night and on cloudy afternoons.

SPECIMENS. A-12 1♀ ANC. A-17 5♂ 2♀ ANC. A-19 1♂ 1♀ ANC. A-20 5♂ ANC, 4♂ 1♀ UM. A-29 1♂ 1♀ ANC. A-30 3♂ 1♀ ANC. A-130 1♂ 1♀ ANC. A-293 2♂ ANC. A-27 1♀ ANC, 2♂ 1♀ ANSP. A-26 3♀ ANC. QUEENSLAND: The Boulders, 6.4 km NW of Babinda, 8 vii 1971 (Liepa) 3♀ ANC. 9.6 km SW of Gor-

donvale, Gillies Hwy, 11 vii 1971 (Liepa) 7♂ 2♀ ANC. 10 mi S of Daintree, 29 iv 1955 (Norris, Common) 1♀ ANC. Byfield, 29 ii 1964 (Common, Upton) 3♂ ANC. Yeppoon, 15 xii 1964 (Common) 1♀ ANC. Mt Bartle Frere, east base, 24 iv 1955 (Norris, Common) 1♂ ANC. 5 mi W of Tully, 23 iv 1955 (Norris, Common) 3♂ ANC. Ingham, 3–4 v 1961 (Straatman) 1♀ ANC. Ingham, 30 iii 1960 (Harley) 1♀ ANC. Barron Falls, nr Kuranda, 12 xii 1964 (Brooks) 1♀ ANC. Cardstone, Tully Falls, 23 i 1965 (Brooks) 1♂ 2♀ ANC. Freshwater, 22 ii 1965 (Brooks) 5♂ 4♀ ANC. Edge Hill, Cairns, 24 iv 1965 (Brooks) 1♂ 3♀ ANC. Bamboo Ck, nr Miallo, N of Mossman, 25 iv 1967 (Colless) 1♀ ANC. Jubilee Rd., 4½ mi NE of Innisfail, 4 xi 1966 (Britton) 2♂ 2♀ ANC. 4½ mi NE of Innisfail, 4 xi 1966 (Britton) 2♂ 3♀ ANC. 3 mi W of Mourilyan, 5 xi 1966 (Britton) 1♀ ANC. Palmerston Nat. Park, on Tully-Cairns Power Line, 6 xi 1966 (Britton) 2♀ ANC. The Boulders, Babinda, 10 v 1967 (Colless) 2♂ 1♀ ANC. W slopes of Seymour Ra, Dinner Ck Road nr Innisfail, 3 xi 1966 (Britton) 5♀ ANC. Mossman, 25 iii 1967 (Upton) 1♂ ANC. 15.30S 145.15E, Keatings Gap, 3 km S by W of Cooktown, 16 v 1977 (Common, Edwards) 1♀ ANC. 16.55S 145.52E, Yarrabah, nr Cairns, 17 v 1976 (Britton) 1♂ ANC. Redlynch, 12–21 viii 1938 (Wind) 3♀ BM. Kuranda, 12 iii 1956 (Gressitt) 1♀ BISH. Cairns, 1917 (Illingworth) 1♂ BISH. Cairns, viii 1904 (Koebele) 1♀ BISH. Babinda (Illingworth) 2♀ BISH. NORTHERN TERRITORY: 12.17S 133.13E, 18 km E by N of Oenpelli, 1 vi 1973 (Key et al.) 1♀ ANC.

Genus METIOCHE Stål

Metioche Stål 1877; 48. Type species: *Trigonidium vittaticolle* Stål 1860. Subsequent designation by Chopard 1968: 331.

Chopard (1968: 331) lists 41 species under this genus, about half of them from the southeast Asia and the southwestern Pacific area, another 16 from Africa, and Indian Ocean islands and two from South America. Australia has three *Metioche* species. All but one of Chopard's 11 Australian species we have removed from the genus. Chopard (1951: 469) lists *M. flavipes* (Saussure). We have

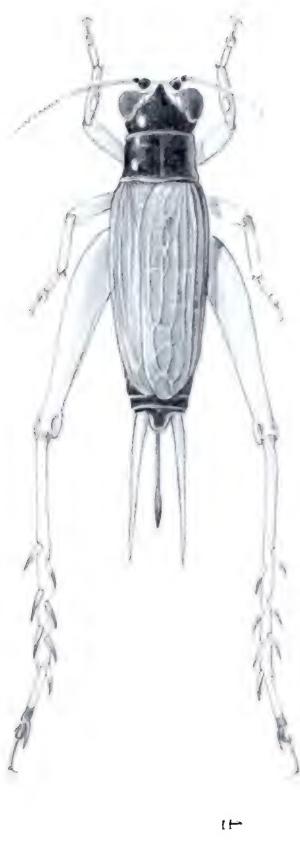


FIG. 168A. *Metioche vittaticollis* female. Non-flying males of this species are very similar in appearance.

examined the type which is not from Australia (type bears the labels: "U" "Novara" "Reise" [= Novara journey?] "Punip A Lept."). Likewise, *Metioche bicolor* (of Malaya) probably does not enter Australia. Other changes we have made are listed.

M. angusta Chopard, transferred to *Amusurgus*.
M. areolata Chopard, synonym of *Trigonidomorpha sjöstedti*.

M. recinervis Chopard transferred to *Parametioche* n. gen.

M. australiana Chopard transferred to *Trigonidium*.

M. albovittata Chopard transferred to *Balamara*.

M. parinervis Chopard transferred to *Trigonidium*.

M. infuscata Chopard transferred to *Trigonidium*.

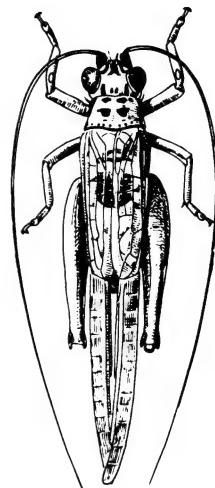


FIG. 168B. *Metioche vittaticollis* (pale macropterous male).

RECOGNITION. Fig. 168. This genus remains poorly defined. If acoustical communication has been lost several times in the Trigonidiinae, as we suspect, then the group may be polyphyletic. This is because the genera have previously been based principally on the nature of the male FW and the functionally coupled auditory tympana. That the latter characteristic is unreliable is evident in the fact that tympana may be present or absent in the same species (see *M. vittaticollis*). The Australian species can be separated from the related genera *Trigonidium*, *Parametioche*, and *Trigonidomorpha* by the following combination of characters: Macropterous or micropterous. Males without stridulum (present in *Trigonidomorpha* males). Dorsum of body with dorsal gland (Fig. 170N) (variable in size; absent in *Trigonidium* and *Parametioche*). Tibia I usually with both inner and outer tympana (but in *M. vittaticollis* sometimes with small inner and no outer tympana or with small outer and large inner, or with no tympana at all). FW's generally flat in lateral profile (rounded in *Trigonidium*) (cf. Figs. 170E and 180A). Females of *Trigonidomorpha* and *Metioche* inseparable. If they lack tympana they may be confused with one another as well as with females of *Trigonidium*. Latter lack dorsal organ and FW's have bowed profile (Fig. 180A).

vittaticollis (Fig. 168)

1. Body color black and pale brown.
2. Pronotum entirely dark or with dark lateral lobes.
3. Male genitalia as in Fig. 170A.

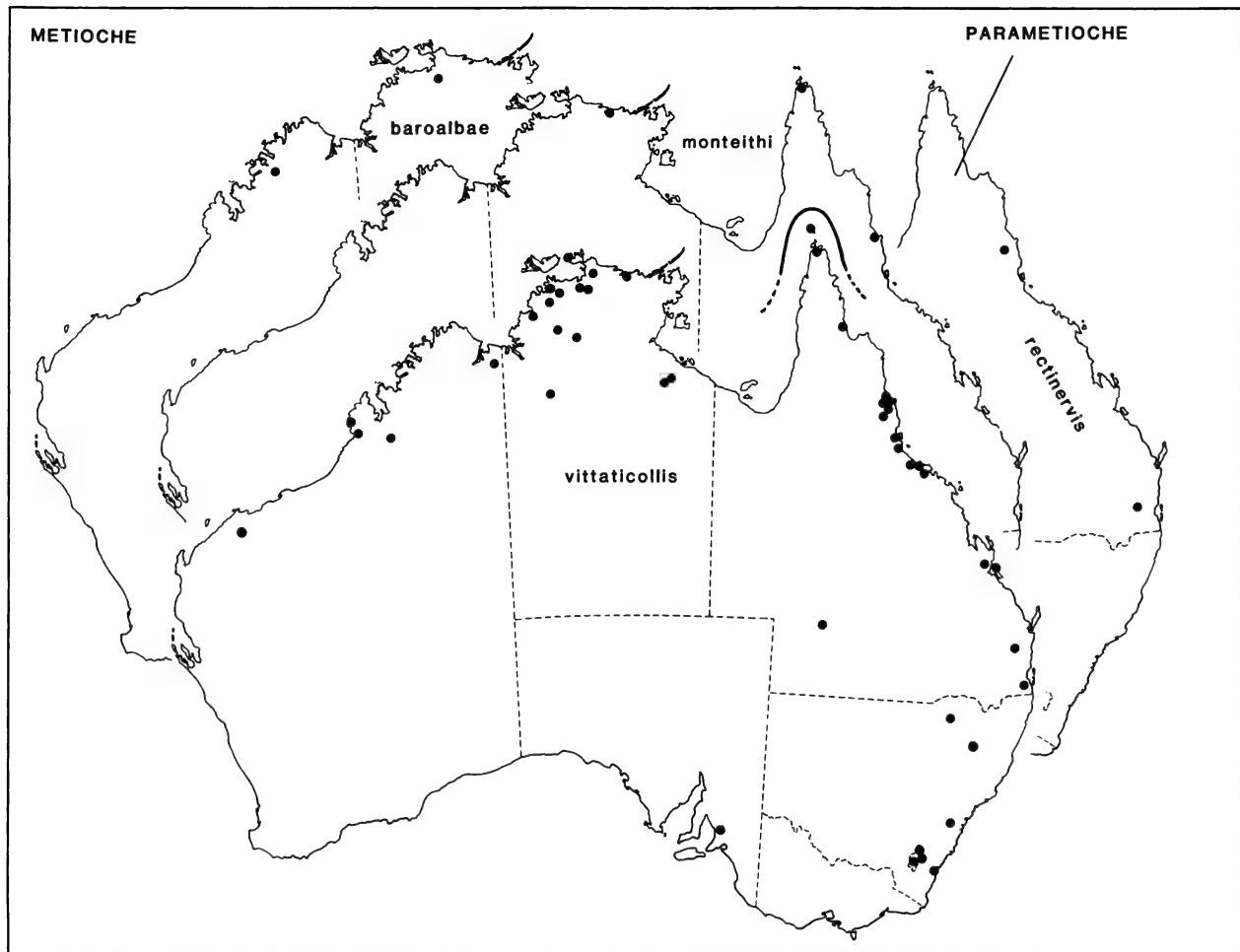


FIG. 169. *Metioche* and *Parametioche* distributions.

monteithi

1. Body color uniformly pale brown or yellowish.
2. Lateral lobes same color as disk.

baroalbae

1. Body pale but with broad median brown streak running length of body.
2. Lateral lobes pale, disk mostly dark.
3. Male genitalia as in Fig. 170B.

Metioche vittaticollis (Stål), Figs. 168, 170AE–KMNO

Trigonidium vittaticolle Stål 1860: 317. Holotype ♀, Manila, SM.

Metioche vittaticollis, Chopard 1925: 32. Type examined.

Metioche vittaticollis insularis Saussure 1878: 470. Holotype ♂

"Nord Austral." VM. Type examined.

M. vittaticollis insularis was considered by Chopard 1951: 469 to be a macropterous form of *M. vittaticollis*. Since the forms seem to represent a

wing dimorphism and may be found at the same localities we will not use the subspecies category. *Trigonidium flavipes* Saussure was recorded by Chopard as being from Australia. The type of this species was examined and is not from Australia and we believe the specimens Chopard examined to be a micropterous form of *Metioche vittaticollis* (see discussion of variation under Recognition below). The same can be said for *Metioche bicolor* Stål whose type is from Java.

RANGE. Widespread across northern and eastern Australia.

RECOGNITION. Males without stridulum. Male genitalia as in Fig. 170A. FW's pale brown, and transparent (especially in alcohol). Dorsal organ varies in size. Individuals with large organ also pos-

sess large tympana, while individuals with small organs have either small inner and no outer tympanum or small outer and larger inner tympana or no tympana at all. Similar trend observed in *Tetragonidomorpha sjöstedti*. Individuals with small organs are from A-16, A-30, A-29, A-4, A-55, and A-141. These localities also have individuals with large organs. Of 61 individuals examined 45 possessed large organ and prominent inner and outer tympana with inner one being slightly larger.

Body color quite variable. Macropterous individuals largely pale brown or straw colored (Fig. 168) while micropterous individuals dark brown to black with pale legs and intersegmental membranes. Facial patterning variable—sometimes nearly entirely dark, sometimes with circular pale areas on frons above epistomal suture and with pale band between lower front of eye and epistomal suture. Tergum and sternum dark brown to black in most micropterous individuals; pale brown in macropterous individuals. Body length 5–6 mm to end of abdomen. FW ca. 3.6 to 4.2 times as long as pronotum. Femur III as long as tibia III. Cerci 2.0 to 2.3 mm.

HABITAT. Usually found by sweeping through grass along streams and ponds.

SPECIMENS. Holotype ♀ SM. A-6 2♂ 1♀ ANC. A-12 7♂ 1♀ ANC. A-16 3♂ 1♀ ANC, 2♂ 5♀ UM. A-17 6♂ 6♀ ANC. A-20 2♀ ANC. A-21 2♂ ANC. A-23 1♂ 1♀ ANSP. A-27 6♂ ANC. A-29 2♂ ANC. A-30 4♀ ANC. A-55 2♂ ANC. A-141 1♂ 5♀ ANC. QUEENSLAND: Bamaga, Cape York, 15–18 vi 1969 (Monteith) 5♀ uqc. Bamaga, Cape York, 3–6 vi 1969 (Monteith) 3♀ uqc. Redlynch, 12–21 viii 1938 (Wind) 5♀ BM. Redlynch, xi 1938 (Sternitzky) 1♀ BM. Mid. Queensland, 1942, 1♂ 4♀ BM. Yorkeys Knob, N Cairns, 4 ix 1966 (Huggins) 1♀ BM. Cairns, 1–11 i 1963 (Corbet) 1♀ BM. Killymoon, 24 ii 1957 (Harley) 2♂ ANC. Barmoya, 14 mi N of Rockhampton, 8 ix 1954 (Common) 1♀ ANC. Bunya Mts., 13 v 1955 (Norris) 1♀ ANC. 17.00S 145.22E, 6 km W of Mareeba, 15 v 1977 (Common, Edwards) 1♀ ANC. S of Beenleigh, S of Brisbane, 15 x 1960 (Gressitt, Gressitt) 1♀ BISH. Mt Glorious, 5–8 ii 1961 (Gressitt, Gressitt) 1♀ BISH. Mogill, nr Brisbane, 27 ix 1958 (Gressitt) 1♀ BISH. Heron Island, 23 ix 1972 (Chapman) 1♂ 1♀ ANC. Heron Island, 20 ix 1972 (Chapman) 2♂ 2♀ ANC. Halifax, iv 1920 (Muir) 1♀ BISH. Mossman (Illingworth) 1♀ BISH. Cairns, 1917 (Illingworth) 1♀ BISH. Cairns, 1918 (Illingworth) 1♂ BISH. Cairns, 1920 (Illingworth) 1♀ BISH. Gordonvale, 1919 (Illingworth) 3♀ BISH. Gordonvale, 1918 (Illingworth) 3♂ 2♀ BISH. Gordonvale, 1917 (Illingworth) 1♂ 1♀ BISH. Montville, 28 vii 1976 (Cameron) 1♀ ANC. Ellis Beach, N of Cairns, 21 iv 1967 (Colless) 1♀ ANC. Ingham: 15 iii 1961, 1♀; 23 iii 1960, 1♀; 29 iii 1961 1♂ 2♀; 7 iv 1961, 3♂ 6♀; 20 iv 1961, 1♀; 27 iv 1961, 2♂ 2♀ (Harley) ANC. 10.12S 145.49E, Sue (Waraber) Island, 25 i 1978 (Lewis) 1♀ ANC. Bundaberg Ck, Bun-

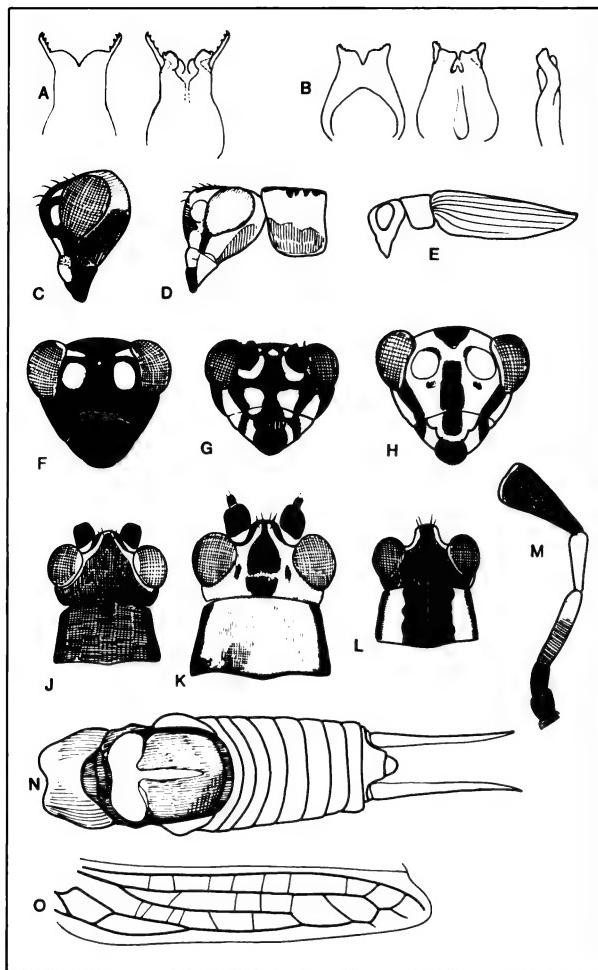


FIG. 170. *Metioche*. A, *vittaticollis* ♂ genitalia; B, *baroalbae* ♂ genitalia; C, *vittaticollis* A-20 short HW's; D, *vittaticollis* A-55 long HW's; E, *vittaticollis* profile; F, G, H, *vittaticollis* facial variation; J, K, *vittaticollis*; L, *baroalbae* holotype; M, *vittaticollis* A-20 max. palp; N, dorsum of *vittaticollis* showing swellings at junction between abdomen and thorax; O, *vittaticollis* ♂ FW venation.

daberg, xi 1971 (Frauca) 1♀ ANC. Ayr, 4 ix 1950 (Riek) 4♂ ANC. 10 mi SW of Ayr, 6 ix 1950 (Riek) 2♂ ANC. Silver Plains Homestead, Cape York Peninsula, 16 v 1962 (Wassell) 2♀ ANC. Cardstone, Tully Falls, 23 i 1965 (Brooks) 1♀ ANC. Freshwater, 22 ii 1965 (Brooks) 1♂ 1♀ ANC. Palmerston Nat. Park, on Tully-Cairns Power line, 6 xi 1966 (Britton) 1♂ ANC. Cannonvale, 1 iv 1967 (Upton) 2♀ ANC. Tinaroo, NNW of Yungaburra, 9 iv 1972 (McFarland, McFarland) 1♀ ANC. 29 km N by W of Thylungra HS, 13 ii 1972 (Lewis) 1♀ ANC. 26.54S 151.36E, Mt Mowbullan Guest House, Bunya Mts, 12 xi 1971 (Key) 4♀ ANC. WESTERN AUSTRALIA: 21.35S 117.04E, ½ km W of Millstream HS, 2 iv 1971 (Riek) 1♂ 2♀ ANC. 21.34S 117.03E, 3 km NW by W of Millstream HS, 11 iv 1971 (Upton, Mitchell) 1♂ ANC. 21.35S

117.04E, 0.5 km WNW of Millstream HS, 7 iv 1971 (Upton, Mitchell) 1♂ 2♀ ANC. Myrooda Crossing, Fitzroy R, 28 v to 6 vi 1951 (Guppy) 1♀ ANC. Kimberley Res. Station, 28 i 1955 (Langfield) 1♂ ANC. Millstream, 8 iv 1971 (Colless) 1♂ ANC. Millstream, 25 x 1970 (Colless) 1♀ ANC. 21.35S 117.04E, 1 km NE of Millstream HS, 15 iv 1971 (Upton, Mitchell) 1♀ ANC. 21.35S 117.04E, 1 km NNE of Millstream HS, 22 iv 1971 (Key, Upton, Mitchell) 1♀ ANC. 17.17S 122.10E, 5 km SSW of Cape Bertholet, West Kimberley district, 21 iv 1977 (Colless) 1♀ ANC. 17.55S 122.13E, 6 km NNW of Broome, 23 viii 1976 (Common) 1♂ 1♀ ANC. SOUTH AUSTRALIA: 35.01 138.42E, Belair Nat. Park, Mt Loftus Ras, 2 xii 1977 (Renzl, Renzl) 1♀ ANC. NORTHERN TERRITORY: Daly River Miss, 26 viii 1974 (Hutchinson) 1♀ ANC. Daly River Miss, 15 vi 1974 (Hutchinson) 2♂ 1♀ ANC. Casuarina Beach, Darwin, 22 x 1972 (Colless) 1♀ ANC. 13.15S 131.06E, Adelaide River (township), 17 x 1972 (Upton) 1♂ 1♀ ANC. Katherine (low level Pk.), 20 viii 1973 (Kelsey) 1♀ ANC. Arnhem Land, Maningrida, 17 iii 1961 (Gressitt) 2♂ 1♀ BISH. Humpty Doo, 5 viii 1966 (Langfield) 1♂ 1♀ ANC. 17.30S 130.47E, 5 mi SW of Wave Hill Police Stn, 14 viii 1969 (Mendum) 1♀ ANC. Darwin, 17 vi 1962 (Southcott) 1♀ ANC. 12.46S 132.39E, 12 km NNW of Mt. Cahill, 20 v 1973 (Key et al.) 1♀ ANC. 12.03S 132.56E, Cooper Ck, 3 km E of Mt Borradale, 31 v 1973 (Key) 1♀ ANC. 11.07S 132.08E, Smith Point, Cobourg Peninsula, 28 i 1977 (Bakker) 1♀ ANC. 16.10S 136.15E, Goose Lagoon, 11 km SW by S of Borroloola, 17 iv 1976 (Key, Balderson et al.) 1♀ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE of Mudginbarry HS, 25 v 1973 (Key) 1♂ 2♀ ANC. 12.48S 132.42E, Nourlangie Ck, 8 km N of Mt Cahill, 21 v 1973 (Key et al.) 2♀ ANC. 14.13S 130.55E, 34 mi NW by W of Dorisvale HS, 14 viii 1968 (Mendum) 1♀ ANC. 16.32S 136.10E, Cattle Ck, 54 km S by W of Borroloola, 27 x 1975 (Upton) 1♀ ANC. 15.34S 130.54E, 4 mi W by S of Coolibah HS, 17 vi 1968 (Mendum) 1♀ ANC. NEW SOUTH WALES: 8 mi SW of Uralla, 11 xi 1948 (Britton, Carne) 1♀ BM. Casula, 10 i 1960 (Nikitin) 1♀ BM. Narrabri, 26 i 1960 (Nikitin) 2♀ BM. Narrabri, 15 iii 1960 (Nikitin) 1♀ BM. Broulee, 25 ii 1962 (Upton) 1♀ ANC. 8 mi S of Captain's Flat, 8 iii 1961 (Chinnick) 1♀ ANC. Chiddowlah, 30 xii 1956 (Riek) 1♀ ANC. Durras Nth, i 1960 (Cameron) 1♀ ANC. Lake George, 10 ix 1950 (Key) 1♀ ANC. ACT: Canberra (Black Mt), 26 iii 1963 (Gay) 1♀ ANC. Canberra, 17-19 ii 1951 (Carne) 1♀ ANC.

Metioche monteithi n. sp.

RANGE. Extreme northern NT and Cape York.

RECOGNITION. Body color entirely yellowish. Both sexes with large inner and outer tympana. Top of body with prominent dorsal organ. FW's with 5 veins visible on dorsal field of left side and 6 veins visible on right side (top view). Both individuals macropterous with HW's extending about one body length beyond end of FW in male and slightly less in female. Ovipositor about 1.78 times as long as pronotum. Body length ca. 4.5 mm in both sexes. Holotype measurements: Body length ca. 4.6 mm to end of abdomen, 10 mm to end of HW; FW length ca. 3.2 mm.

HOLOTYPE. ♂, Bamaga, Cape York, QLD, 15-18 vi 1969 (G. B. Monteith) UQC.

HABITAT. Not known. Collected at lights.

SPECIMENS. Holotype ♂ UQC. ♀ same data as holotype. Kuranda, QLD, 11 iii 1956 (Gressitt) 1♀ BISH. Maningrida, Arnhem Land, NT, 20 iii 1961 (Gressitt) 1♀ BISH.

Metioche baroalbae n. sp., Fig. 170BL

RANGE. Near Mt. Cahill, NT, and Prince Regent River Reserve, WA.

RECOGNITION. Very small, body length less than 4 mm; femur III ca. 3 mm. Body color pale brown and black; legs, face, and sides of body pale brown to yellowish; dorsum with broad central black band from front of head to end of wings. Face yellowish, and with reddish median band descending to clypeus and reddish streak descending from lower margin of eye to base of mandible. Dorsum of pronotum very pale on either side of median dark band, then slightly darker at lateral edges and on lateral lobes (Fig. 170L). FW's extending beyond end of abdomen. HW's extending much beyond ends of cerci. FW's black medially, otherwise pale brown (viewed together). Abdomen entirely light brown.

HOLOTYPE. ♂, 12.47S 132.51E, Baroalba Ck. Springs, 19 km NE by E of Mt. Cahill, NT, 28 x 1972 (Key et al.) ANC.

HABITAT. Woodland along creek.

SPECIMENS. Holotype ♂ ANC. 15.07S 125.33E, Prince Regent River Reserve, WA, 16 viii 1974 (Bailey, Richards) 1♂ ANC.

PARAMETIOCHE n. gen.

TYPE SPECIES. *Metioche rectinervis* Chopard.

This genus is recognized because *P. rectinervis*, its only species, does not fit into any other genus on the basis of male FW and tympanal characteristics. Males lack a stridulum and both sexes have a small outer tympanum. In Australia only *Anaxiphia* possess this last feature. The dorsum of the abdomen lacks a dorsal gland.

Parametioche rectinervis (Chopard), Fig. 179E

Metioche rectinervis Chopard 1901: 471. Holotype ♀, Mount Glorius, QLD, 24 v 1930 (H. Hacker) PM (type also bears the labels "Anaxiphia rectinervis TYPE Chp."). Type examined.

RANGE. Mountains of eastern QLD.

RECOGNITION. Males: Tibia I with small outer tympanum. Male FW without stridulum. Top of head mostly reddish brown and pronotal disk with broad median reddish-brown band, which takes up about $\frac{1}{2}$ of entire disk. FW membrane brown, especially dark on lateral field and with yellow veins on dorsal field. Dorsum of abdomen dark-brown; venter pale, yellowish, but subgenital plate dark-brown. Male genitalia as in Fig. 179E. Body length ca. 5.00 mm; femur III 4.2 cm; cerci 2.3 mm.

HABITAT. Unknown.

SPECIMENS. Holotype ♀ PM. Wallacha Falls, Palmerston Highway, N QLD, 30 iv 1967 (Colless) 1♂ ANC.

BALAMARA n. gen.

TYPE SPECIES. *Balamara marroo* n. sp.

This genus includes three species. One of them has lost its stridulum and its tympana entirely; another lacks tympana but retains a well developed stridulum. The third retains outer tympana and a well-developed stridulum. The genus is defined on the basis of male genitalia and body coloration.

RECOGNITION. Dorsum of body with white bands running along lateral margins (Fig. 171). Face usually strongly banded (similar banding seen in *Trigonidium australiana* females). Stridulum not rudimentary (as in *Trigonidomorpha*).

albovittata

1. Males and females usually without tympana (see discussion of WA specimens).
2. Males without stridulum.

gidya

1. Males (and females?) without tympana.
2. Males with stridulum.

marroo

1. Males and females with outer tympana.
2. Males with stridulum.

Balamara marroo n. sp., Figs. 171, 173ACDF

RANGE. Southcentral VIC.

RECOGNITION. Top sides of body dark and with two pale bands running along lateral margins of dorsal surface. Side of head banded as in Fig. 173D. Scape dark brown. Male FW venation as in Fig. 173A. FW largely transparent on dorsal field but with brown pigmentation in cells. Tibia I with small, slightly oval, outer tympanum. File of holotype with 156 teeth. Labrum and mandibles dark brown.

Clypeus mostly pale. Frons with two horizontal dark lines, one between antennae, other along epistomal suture. Lateral lobes mostly black. Ovipositor ca. 0.4 times as long as femur III. Body length ca. 6 mm. Holotype measurements: FW 3.25 times as long as pronotum and 0.87 times as long as femur III. Femur III 1.15 times as long as tibia III. Body length 5.9 mm; femur III 3.96 mm; cerci 2.66 mm.

HOLOTYPE. ♂, A-316, Whittlesea, VIC, 14 xii 1968, ANC.

SONG. Not known. Collected in daytime.

HABITAT. Collected in moist green grass along stream and also in forest in Dandenong Mts.

SPECIMENS. Holotype ♂ ANC. A-316 7♀ ANC. A-426 1♀ ANC. Baxter, VIC, 12 iii 1966 (Grant) 1♀ BM.

Balamara gidya n. sp., Fig. 173BEHJ

RANGE. Mountains of southeastern NSW and VIC.

RECOGNITION. Males: FW with well-developed stridulum bearing 149 file teeth. Fore tibiae without trace of tympana. Side of body black; dorsum with broad central dark brown band and very pale lateral stripes (Fig. 173H). FW's brownish, somewhat transparent on dorsal field; black on lateral field. Abdomen entirely black. Genitalia as in Fig. 173E. Body length 5 mm; femur III ca. 3.8 mm.

HOLOTYPE. ♂, Blundell's ACT 30 i 1930 (L. F. Graham) ANC.

SONG. Not known.

HABITAT. Not known.

SPECIMEN. Holotype ♂ ANC. Boned Swamp, Mornington Peninsula, VIC, 8 i 1980 (Evans) 1♂ 1♀ ANC.

Balamara albovittata (Chopard), Figs. 171, 173G

Metioche albovittata Chopard 1951: 470. Holotype in South Australian Museum was destroyed. Neotype ♂, here designated, Black Mountain, ACT, light trap, 25 xi 1963 (Common) ANC.

RANGE. Southeastern QLD to southern VIC and extreme southwestern WA.

RECOGNITION. FW without stridulum. Tibiae without tympana (except male from Geraldton, WA, and female from Pemberton, WA, which have an outer tympanum; male and female from Beedelup Falls, WA, lack tympana). Body color black and with two white stripes along dorsolateral surfaces of FW's (this character shared with *T. killawara* of Meekap-

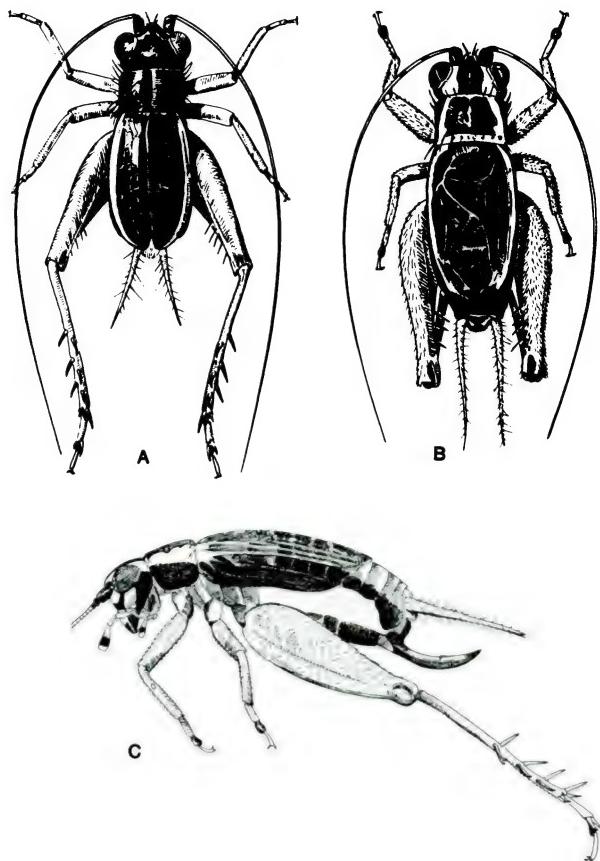


FIG. 171. *Balamara*. A, *albovittata* male; B, *marroo* male; C, *marroo* female.

pa Group). Head black. Top of head with white streaks, one from each eye extending to rostrum, but not meeting. Basal two antennal segments black. Palpi light brown. Legs and cerci light brown. Pronotum and abdomen black. Body length ca. 5 mm; femur III 3.75 mm; cerci ca. 1.8 mm. Female from Black Mt., ACT, has pale wing stripes extending forward across pronotum and to back of eye. Ovipositor 1.92 times as long as pronotum.

HABITAT. Low moist meadows.

SPECIMENS. Neotype ♂ ANC. A-320 1♀ ANC. ACT: Black Mt, x-xii (Common) 6♂ 8♀ ANC. VICTORIA: 37.08S 142.31E, Halls Gap, 13 xii 1977 (Rentz) 1♀ ANC. NEW SOUTH WALES: Bruxner Pk, (1) and (2) 19 iv 1970 (Colless) 1♂ ANC. 7 mi W Rosebank, 1700 ft, 8 xi 1961 (Common, Upton) 1♂ ANC. Tooloom, 30 x 1961 (Common, Upton) 1♂ ANC. Mt. Keira, 4 xi 1956 (Riek) 1♀ ANC. QUEENSLAND: Lamington National Park, 7 xi 1961 (Common, Upton) 1♀ ANC. WESTERN AUSTRALIA: Beedelup Falls, 13 xi 1958 (Riek) 1♂ 1♀ ANC. Geraldton, Chapman R,

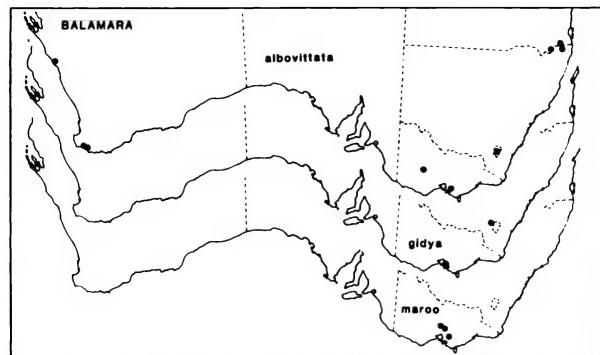


FIG. 172. *Balamara* distributions.

6 i 1966 (J. A. Grant) 1♂ BM. Pemberton, WA, 25 i 1966 (Grant) 1♀ BM.

Genus TRIGONIDOMORPHA Chopard

Trigonidomorpha Chopard 1925: 39. Type species: *Trigonidomorpha sjöstedti* Chopard, by monotypy.

Chopard (1968: 328) includes nine species in the genus, six from Africa, one from Ceylon, one from Reunion Island, and *T. sjöstedti*, a widespread species through the southwest Pacific area. Here we add one new species, *T. ammonga*. The group is erected on the basis of the male FW which possesses a small stridulum and lacks a well-developed mirror (Fig. 176EFG). Although we have not seen any of the other types we suspect that the group may be polyphyletic given the frequency with which stridulatory files are lost in the Trigonidiinae. We suspect that some of the species in the genus are unrelated and are grouped together because they have independently undergone a reduction in the FW venation.

RECOGNITION. Fig. 174. Males with very small stridulatory vein. Mirror absent or poorly developed (Fig. 176EFG). Tibia I with inner and outer tympana or lacking both. Both sexes with dorsal gland. Male genitalia as in Fig. 176ABC. Very similar to *Metioche* but in latter males lack stridulum.

sjöstedti

1. Stridulatory file very small (Fig. 176E).
2. Genitalia as in Fig. 176A.
3. Femora I and II pale.

ammonga

1. Stridulatory file longer (Fig. 176G).
2. Genitalia as in Fig. 176C.
3. Femora I and II blackish.

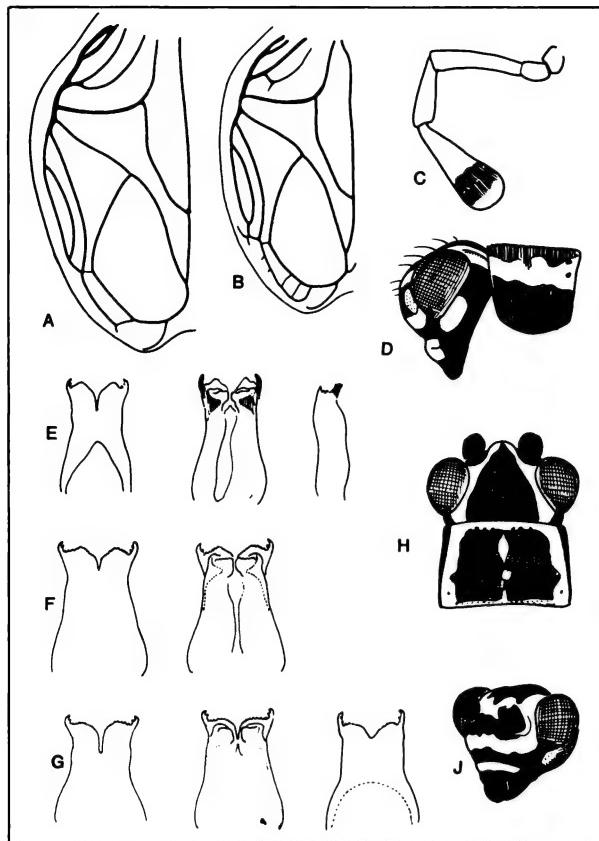


FIG. 173. *Balamara*. A, *marroo* holotype; B, *gidya*; C, *marroo* max. palp; D, *marroo* holotype; E, *gidya* holotype genitalia; F, *marroo* genitalia; G, *albovittata*, left two of the holotype, right one from Beedelup Falls; H, *gidya* holotype; J, *gidya* holotype.

Trigonidomorpha sjöstedti Chopard, Figs. 174, 176ABDEF

Trigonidomorpha sjöstedti Chopard 1925: 40. Holotype ♂, Cedar Creek, QLD (Mjöberg) SM. Type examined.

Metioche areolata Chopard 1925: 38. Holotype ♂, Mount Tamborine, QLD, SM. Type examined. NEW SYNONYM.

RANGE. Northern and eastern periphery of continent.

RECOGNITION. Males with small stridulatory file. Body color black. Legs and cerci pale. Labrum brown, clypeus light brown. Frons and cheeks blackish. Top of head banded as in Fig. 176D. Pronotum entirely blackish. Genitalia as in Fig. 176AB. FW venation as in Fig. 176EF. Tympana on inner and outer faces of tibia I, or entirely absent

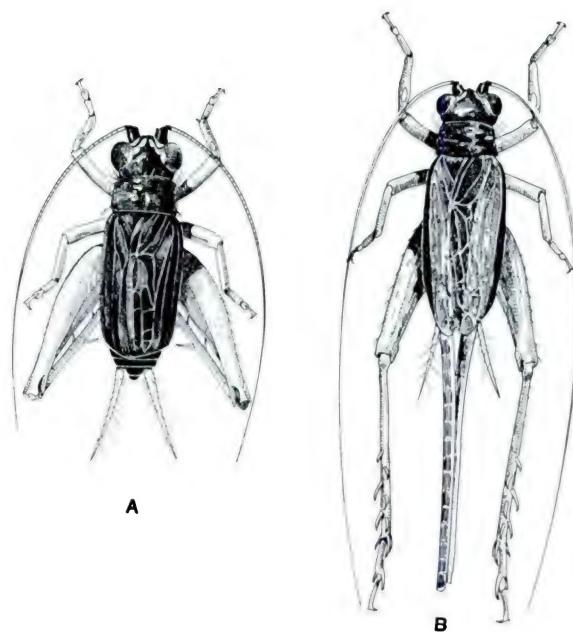


FIG. 174. *Trigonidomorpha sjöstedti*. A, micropterous male; B, macropterous male.

(see Variation). Otherwise quite similar to *Metioche vittaticollis*. In macropterous males FW's brown to light brown and HW's about twice as long as FW's. Body length 5.0–5.5 mm, femur III ca. 3.9 mm; cerci ca. 1.6 mm. File with 14 or fewer teeth.

Females cannot reliably be separated from *Metioche vittaticollis* if they are not associated with males.

VARIATION. The ANC collection contains 4 macropterous males believed to be this species on the basis of the genitalia, the presence of a small stridulatory vein, the tympana, and the presence of a dorsal organ.

This species is evidently quite variable across its range. At present there is not sufficient evidence to separate the specimens which have slightly differing morphology into different species. Following are some of the more striking differences: Specimens from Rockhampton and the Gascoyne River, WA, evidently lack dorsal glands and tympanal openings. The genitalia and the small stridulatory files are similar, however. A male from Samford, QLD, possesses at least a vestigial tympanum on the internal surface of the right tibia, but no tympana in the left leg. A male from Brisbane possesses tym-

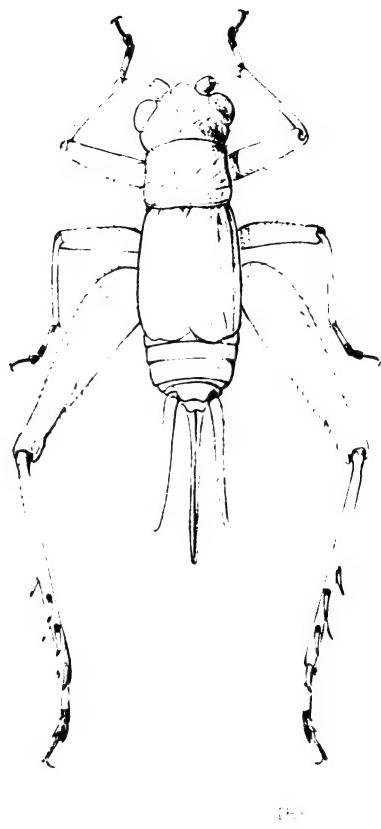


FIG. 174b. *Dolichoxipha danbulla* female.

pana only on the internal surfaces. This latter male also possesses small genitalia unlike other populations and has no dorsal gland.

SONG. Not known. Because the stridulum is so small and the tympana are lost in some populations we believe that this species no longer stridulates.

HABITAT. Collected from green herbaceous vegetation within 3 feet of ground in damp areas, particularly along streams, sometimes appearing localized on vegetation overhanging water's edge.

SPECIMENS. Holotype ♂ SM. A-3 1♂ 1♀ ANSP. A-16 2♀ ANC. A-55 1♂ UM. A-299 1♂ 1♀ ANC. A-704 3♂ 2♀ ANC. QUEENSLAND: Yeppoon, 16 xii 1964 (Common) 1♂ ANC. Forest Reserve No. 194, Mt. Baldy, nr Atherton, 5 xii 1968 (Britton, Misko) 1♂ ANC. 3.3 km W of Childers, 4 vii 1971 (Liepa) 1♂ ANC. Burnett R crossing, 10 km N by E of Eidsvold, 9 i 1970 (Britton, Holloway, Misko) 1♂ ANC. Mt Glorious, 5-8 ii 1961 (Gressitt,

Gressitt) 1♂ BISH. S of Beenleigh, S of Brisbane, 15 x 1960 (Gressitt, Gressitt) 1♂ BISH. Bibbie Isl, 1 ix 1968 (Hocking) 1♀ ANC. Samford, 19 xii 1961 (Lindsay) 1♂ 1♀ ANC. Brisbane, 15 iii 1965 (Mooney) 1♂ UQC. Granite Creek, Bulburin State Forest via Many Peaks, 1 iv 1972 (Monteith) 1♂ UQC. NORTHERN TERRITORY: 16.47S 135.45E, McArthur R, 14 km S by W of Cape Crawford, 25 x 1975 (Upton) 1♂ ANC. nr Borroloola, 29-30 x 1975 (Upton) 1♂ ANC. Arnhem Land, Maningrida, 20 iii 1961 (Gressitt, Gressitt) 1♂ BISH. Black jungle nr Humpty Doo, 24 ix 1958 (Gressitt) 1♀ BISH. NEW SOUTH WALES: Upper Allyn R, 8 ii 1961 (Common, Upton) 2♂ ANC. Clyde Mt, 23 i 1961 (Common, Upton) 1♂ ANC. Sydney (Turramurra), ii 1971 (Clyne) 1♂ ANC. 40 km N of Walgett, 19 vi 1976 (Liepa) 1♂ ANC. Upper Kangaroo River, 28 i 1968 (Key) 1♂ ANC. Cabramatta, 2 xii 1965, 1♀ BM; 2 i 1966, 1♂ BM; 20 xii 1965, 1♀ BM; 23 xii 1965, 1♀ BM; 2 ii 1965, 1♂ BM (Nikitin). Narromine, viii 19?? (Minter) 1♂ ANC. WESTERN AUSTRALIA: Martin's Well, West Kimberley, 24 iv 1977 (Colless) 1♂ ANC.

Trigonidomorpha ammonga n. sp., Fig. 176CG

RANGE. Type locality in extreme southwestern WA.

RECOGNITION. Differs from *T. sjöstedti* principally in FW venation (Fig. 176G) and male genitalia (Fig. 176C) and in having black front and middle femora. Stridulatory file with ca. 50 teeth. Tibia I without any trace of inner or outer tympana. Dorsum of head and pronotum dark brown. FW's dark brown, reaching to end of abdomen. Face, cheeks, and lateral lobes black. Maxillary palpi brownish, becoming black in distal half of 5th segment. Dorsum and venter of abdomen black. Femora I and II black. Tibiae I and II pale brown. Femur III missing. Cerci pale brown. Body length ca. 5.0 mm; FW length ca. 3 mm.

HOLOTYPE. ♂, Applecross, WA, 7 vii 1963 (C. M. Riley) ANC.

SPECIMENS. Holotype ♂ ANC.

Genus DOLICHOXIPHA Chopard

Dolichoxipha Chopard 1951: 472. Type species: *Anaxipha gracilipes* Chopard 1925: 41, by monotypy.

The genus includes two species both from the vicinity of Cairns, QLD.

RECOGNITION. Fig. 174b. Body color yellowish. Legs I and II extremely slender. Tibia III with 2 or 3 inner and 2 or 3 outer subapical spurs. Tibiae I without tympana. FW's not reaching end of abdomen. Top of FW relatively flat in profile, not bowed

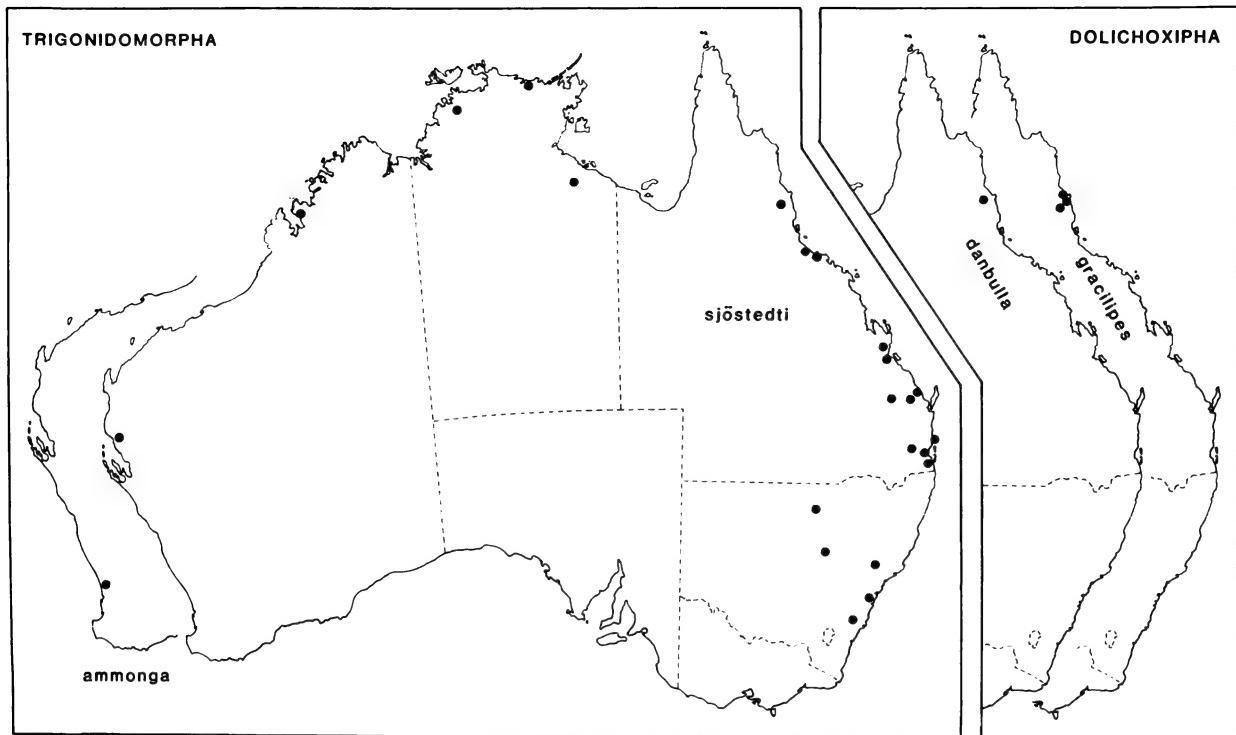


FIG. 175. *Trigonidomorpha* and *Dolichoxipha* distributions.

as in *Trigonidium*. Ovipositor relatively long, ca. 2.5 times as long as pronotum. Head flattened somewhat as in *Anaxipha*. Surface of FW's with scattered fine setae. Body color pale yellow. Male genitalia not known.

gracilipes

Tibia III with 3 inner and 3 outer subapical spurs.

danbulla

Tibia III with 2 inner and 2 outer subapical spurs.

Dolichoxipha gracilipes (Chopard)

Anaxipha gracilipes Chopard 1925: 41. Holotype ♀, Bellenden Ker, QLD (Mjöberg) sm. Transferred to *Dolichoxipha* by Chopard 1951: 472. Type examined.

RANGE. Cairns region of northeast QLD.

RECOGNITION. See generic recognition. Differs from *D. danbulla* in having 3 inner and 3 outer subapical spurs. Male genitalia unknown. Inexplicably, the genitalia from the only existing male could not be found within the male.

HABITAT. Rain forests.

SPECIMENS. Holotype ♀ sm. Atherton Tableland, QLD, 9 v 1961 (Gressitt) 1♀ BISH. Whitfield Range Forest Reserve, Cairns,

QLD, 19 iv 1967 (Colless) 1♀ ANC. Kuranda, QLD, 13 iii 1956 (Gressitt) 1♂ 1♀ BISH.

Dolichoxipha danbulla n. sp., Fig. 174b.

RANGE. Type locality in Cairns region of northeast QLD.

RECOGNITION. Females: Differs from *gracilipes* in having two inner and two outer subapical spurs. Head ca. 1.12 times as wide as pronotum. FW's ca. twice as long as pronotum. Femur III exactly equal to tibia III in length. Tibia III 4.8 times as long as basitarsus III. Body length ca. 6 mm to end of abdomen, and 8 mm to end of ovipositor. Length ca. 4.7 mm; cerci ca. 3.0 mm.

HOLOTYPE. ♀, Mt. Edith, 4–7 mi off Danbulla Road, QLD, 27 iv 1967 (Colless) ANC.

HABITAT. Coastal forests.

SPECIMENS. Holotype ♀ ANC. Same data as holotype, 1♀ ANC.

Genus *TRIGONIDIUM* Rambur

Trigonidium Rambur 1839: 39. Type species: *Trigonodium cincteloides* Rambur 1839, by monotypy. We examined specimens determined by Chopard (Fig. 179A).

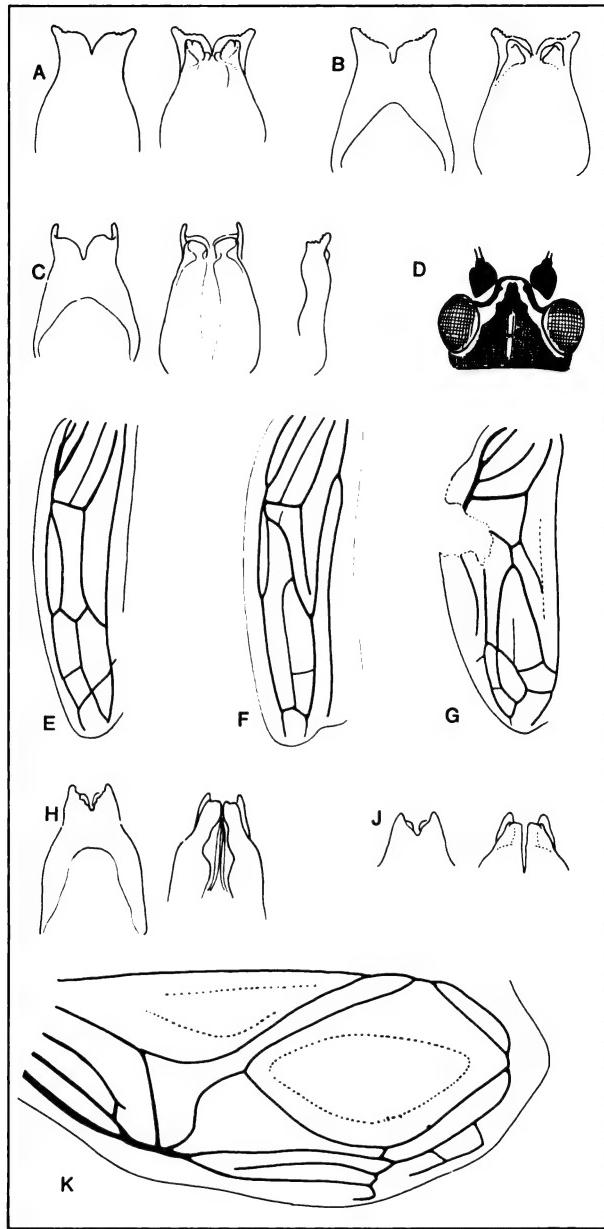


FIG. 176. *Trigonidomorpha* and *Homoeoxipha*; A, *T. sjöstedti* A-55; B, *T. sjöstedti* A-293; C, *T. ammonga*; D, *T. sjöstedti* A-293; E, *T. sjöstedti* ♂ FW A-293; F, *T. sjöstedti* ♂ FW A-55; G, *T. ammonga* ♂ holotype; H, J, *Homoeoxipha lycoides* ♂ genitalia; K, *Homoeoxipha lycoides* ♂ FW.

Chopard (1968: 340) includes seven species in the genus all from countries around the Indian Ocean (Mauritius, Madagascar, Africa, India, Java). He does not list any species from Australia. But on the

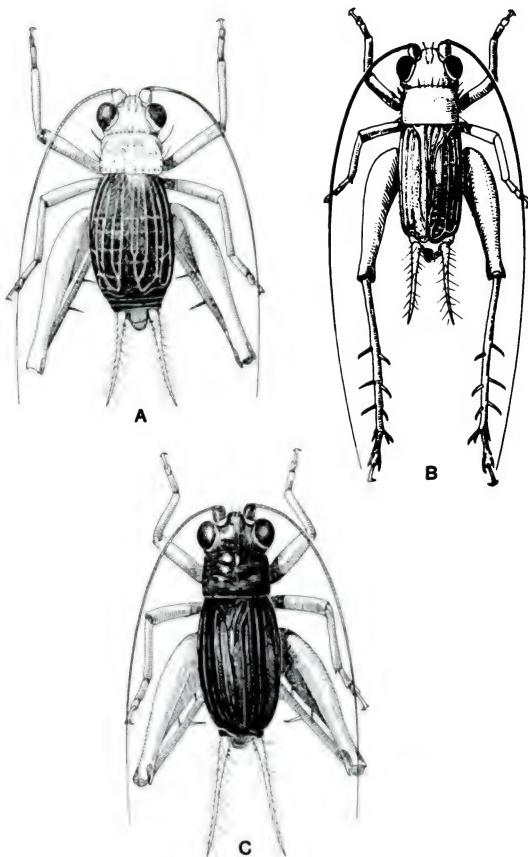


FIG. 177. *Trigonidium*. A, *parinervis* male; B, *meekappa* male; C, *australiana* male.

basis of the diagnostic features given below most of the species he formerly assigned to *Metioche* (Chopard 1951, 1968) belong in this genus. We include ten Australian species in the genus, six of which are new. Chopard's *Metioche angusta* is here transferred to *Amusurgus* and his *Metioche rectinervis* is assigned to the new genus *Parametioche*.

RECOGNITION. Differs from *Metioche* principally in lacking auditory tympana and dorsal gland. *Balamara albovittata* very similar to *Trigonidium* species but has white stripes along dorso-lateral margins of body. Males without stridulum. Dorsal veins of FW's parallel and similar in two sexes. Dorsum of body without dorsal organs. Body smooth and shiny. Top of FW's rounded in lateral profile (Fig. 180A). Always seem micropterous. Body length usually less than 6.0 mm. Body color variable—some species have black bodies and yellowish legs, some entirely yellowish, and some in-

TABLE 15. Comparison of *Trigonidium* species.

	Body color	Color of head, pronotum	Color of subgenital plate	Color of FW's	Other distinguishing features
<i>australiana</i> ♂	black and yellow	black	black	black	
	♀	light brown and dark brown	dark central band	pale brown	brown ♀ with a strong median dark band on head and pronotum.
<i>canberra</i>	black and yellow	black	black	♂ black, ♀ black at least on sides	
<i>infuscata</i>	yellow and black	blackish on sides	black	blackish on sides	
<i>parinervis</i>	yellow and black	yellowish	blackish	mostly dark brown or black	Veins of FW sometimes yellowish. Head and thorax yellow. FW and abdomen black.
<i>lalwinya</i>	yellow and black	sides black, dorsum brown to dark brown	♂ black, ♀ pale	black, white at front center	FW's whitish at center next to pronotum.
<i>canara</i>	yellowish and black	yellowish, reddish head	dark brown to black	pale brownish yellow veins	Abdomen black above.
<i>killawarra</i>	yellowish and black	yellowish, reddish head	dark brown	brownish, 2 pale lateral stripes	Top of head with 4 reddish longitudinal lines. FW's with pale lateral longitudinal stripes. Top of abdomen dark brown.
<i>amarina</i>	yellowish	yellowish	brown medially	brownish membrane, yellow veins	
<i>bundilla</i>	yellowish	yellowish	dark brown	mostly yellowish	Disk of pronotum with pale median line (Fig. 180B).
<i>goobita</i>	yellowish	yellowish	pale	mostly yellowish	
<i>meekappa</i>	yellowish	yellowish	pale	mostly yellowish	

termediate. Epiphallus usually with prominent lateral arms.

The members of this genus usually occur in moist grasses or in herbaceous vegetation, often along streams and ponds and sometimes in moist swales.

KEY TO SPECIES GROUPS

- Dorsum of body black and with white stripes along the dorso-lateral angle (Fig. 171A) (not *Trigonidium*)
..... *Balamara albovittata*
Dorsum of body yellowish, brown, or black, but without white dorso-lateral stripes (*Trigonidium*) 2
- Scape black. Head and pronotum mostly black above in males (Fig. 177C); with a broad central dark band on the head and pronotum in females (Fig. 180CD)
..... Australiana Group
Scape brown or yellowish. Head and pronotum yellowish or brownish 3

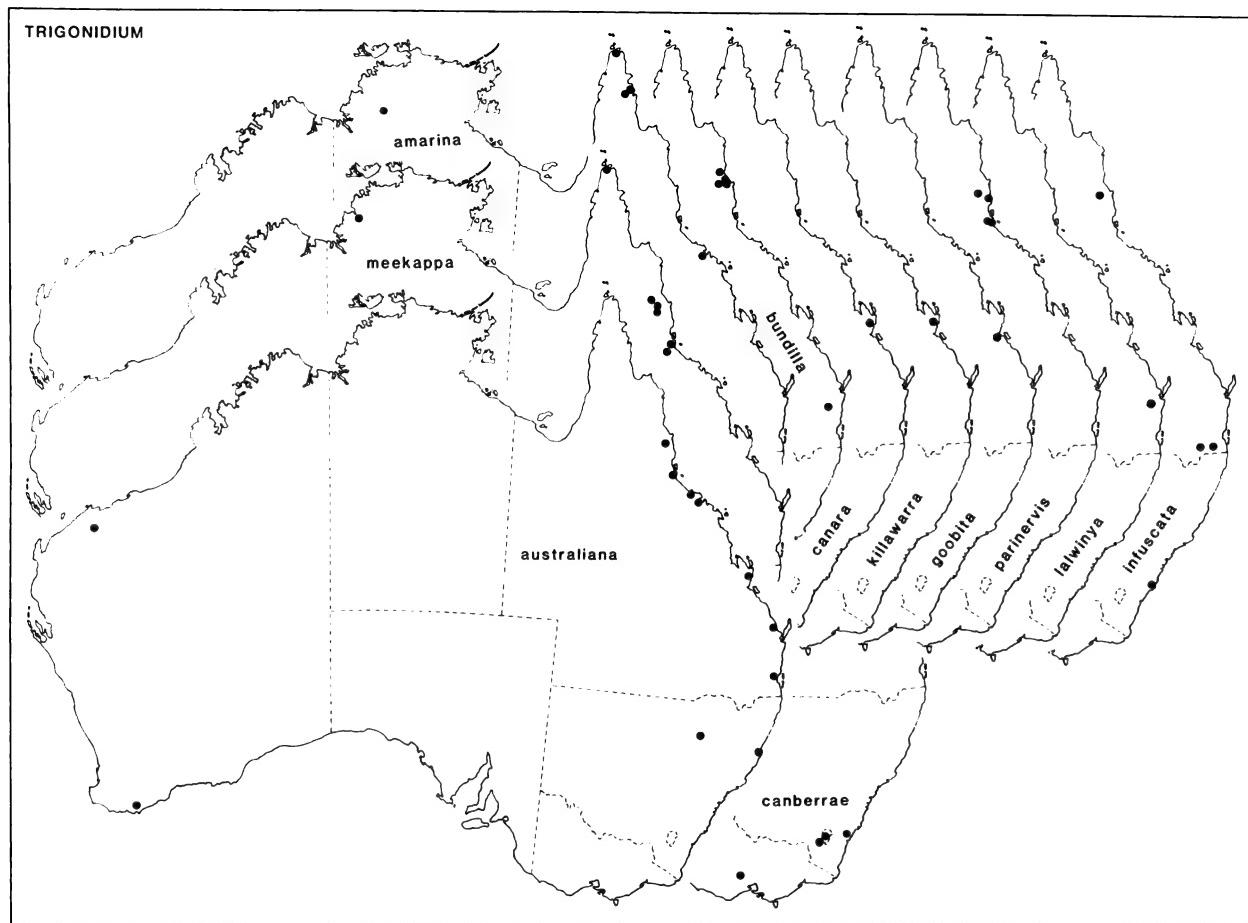
- FW's entirely dark brown or black or at least dark on the lateral field (veins may be pale or dark) (Fig. 177A)
..... Parinervis Group
FW's yellow, light brown, or medium brown (Fig. 177B)
..... Meekappa Group

AUSTRALIANA GROUP

Face, head, pronotum, FW's, and abdomen black in males; variable in females. *T. australiana* differs from *T. canberra* as follows:

australiana

- Male genitalia as in Fig. 179D.
 - Females black on side of body and FW's.
- canberra*
- Male genitalia as in Fig. 179H.
 - Females brown on side of body and with dark brown central band on dorsum (Fig. 180CD).

FIG. 178. *Trigonidium* distributions.

Trigonidium australiana (Chopard), Figs. 177C, 179DJ

Metioche australiana Chopard 1925: 36. Holotype ♂, Herberton, Queensland (Mjöberg) SM. Type examined.

RANGE. Northern QLD and WA.

RECOGNITION. Males: Head, thorax and abdomen usually black but sometimes brownish. Bottom of abdomen always black. In palest individuals dorsum yellowish but sides of body dark brown. Legs, palpi, and cerci pale, yellowish. Male genitalia as in Fig. 179D. FW about 3.77 times as long as pronotum. Superficially similar to micropterous *Trigonidomorpha sjöstedti*, but in latter males have small stridulum and both sexes usually have inner tympana.

Females: Differing from *T. canberra*e in being

black on face and side of body. Dorsum of wings and pronotum usually lighter than sides.

HABITAT. Collected by sweeping in herbaceous vegetation.

SPECIMENS. Holotype ♂ SM. A-4 2♀ ANC. A-17 2♂ 1♀ ANSP. A-20 1♀ ANC. A-55 1♂ UM. A-27 2♂ ANC. QUEENSLAND: Byfield, 10 v 1955 (Common, Norris) 1♂ ANC. Samford, 19 xii 1961 (Lindsay) 1♀ ANC. Bundaberg Ck, Bundaberg, xi 1971 (Frauca) 2♀ ANC. NEW SOUTH WALES: Scott's Head, nr Macksville, 13 ii 1968 (Colless) 1♀ ANC. Narrabri, 27 i 1960 (Nikitin) 1♀ BM. 15 mi S Coolae, 8 iv 1951 (Cane) 1♀ ANC. WESTERN AUSTRALIA: 1 km NNE Millstream HS, 21.35S 117.04E, 22 iv 1971 (Key et al.) 1♂ ANC. 10 mi NNW Albany, 27 iii 1968 (Common, Upton) 1♂ ANC.

Trigonidium canberrae n. sp., Figs. 179H, 180CD

RANGE. Extreme southeastern NSW to southern VIC.

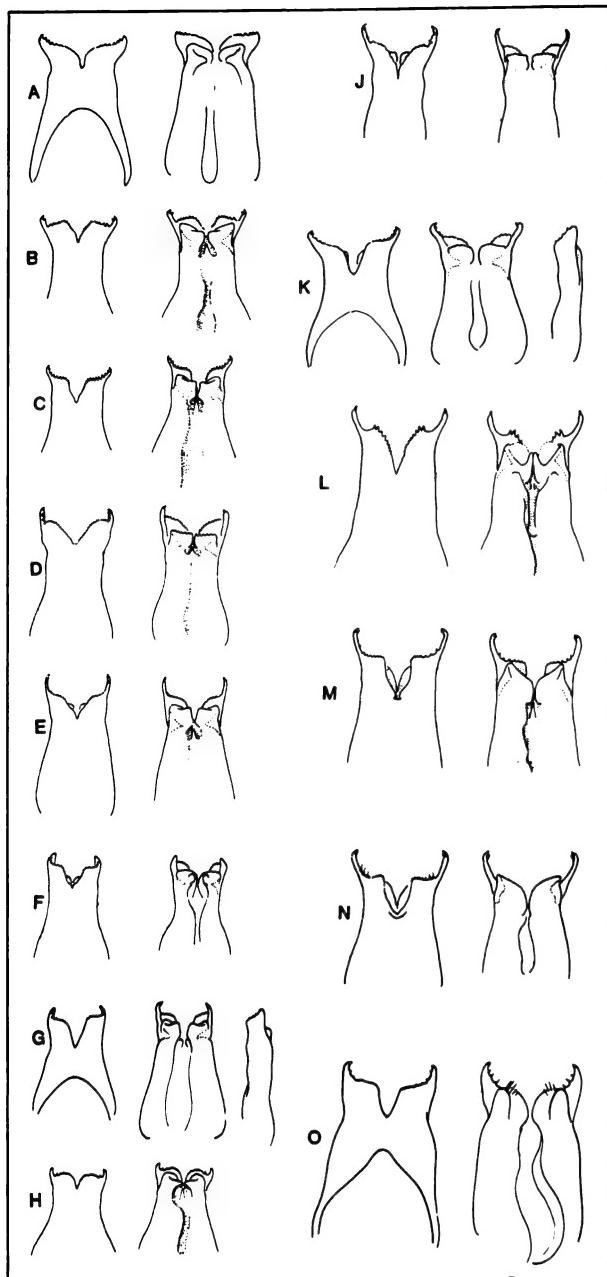


FIG. 179. *Trigonidium* male genitalia. A, *cicindeloides* Abyssinia (type species of genus); B, *goobita* A-299; C, *bundilla* A-29; D, *australiana*; E, *Parametioche rectinervis*; F, *canara* Byfield QLD; G, *killawarra* Byfield QLD; H, *canberraee* holotype; J, *australiana* A-17; K, *lalwinya* holotype; L, *amarina* holotype; M, *meekappa* A-19; N, *meekappa* A-293; O, *parinervis* A-19.

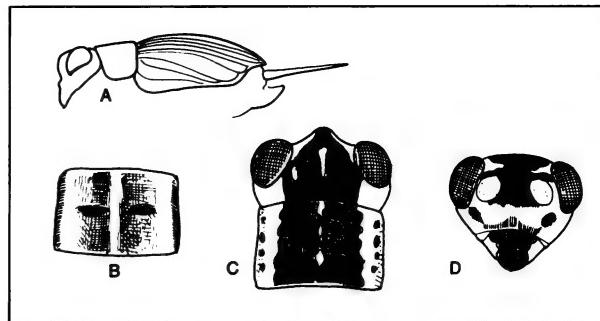


FIG. 180. *Trigonidium*. A, profile characteristic for genus; B, *bundilla* holotype; C, *canberraee* ♀; D, *canberraee* ♀.

RECOGNITION. Males: With black body and yellowish legs. Face entirely black. Distinguishable from *A. australiana* only by genitalia (Fig. 179H). Body length 4 mm; femur III ca. 3.5 mm.

Females: Body color mostly light brown but with broad dark brown to blackish dorsal band (about half as wide as head). Band usually bisected by very thin central pale streak. Scape blackish. Face banded as in Fig. 180D. Lateral lobes pale brown and with dark spots. FW's entirely light brown and somewhat transparent; veins about same color as membrane. Venter of thorax blackish. Abdomen dark brown to black in first 6 or 7 segments, pale in last segments. Body length 5–6 mm; femur III 3.8–4.5 mm.

HOLOTYPE. ♂, Black Mt, ACT, light trap, 2 viii 1962 (Common) ANC.

HABITAT. Probably lush, moist grasses.

SPECIMENS. Holotype ♂ ANC. 15♂ 81♀, same locality as holotype, collected from June to November, ANC. Greendale, VIC, 3 x 1954, 1♂ ANC. Rotary Lookout, 10 mi NW of Milton, NSW, 12 iv 1968 (Liepa) 1♂ ANC. Orroral R, 1 mi NNW Orroral Tracking Station, ACT, 10 xii 1967 (Key) 1♀ ANC.

PARINERVIS GROUP

This group tentatively includes two species which differ from the Australiana Group in having the dorsum of the head and pronotum yellow or brownish but not entirely black, and from the Meekappa Group in having the FW's blackish, at least on the lateral field.

parinervis

Head and pronotum entirely yellowish. Male genitalia as in Fig. 179O.

infuscata

Sides of pronotum darker than disk, and disk darker in center than along lateral margins.

lalwinya

Face and side of head black. FW's mostly black but white at front, center.

Trigonidium parinervis (Chopard), Figs. 177A, 179O

Metioche parinervis Chopard 1925: 34. Holotype ♂, Herberton, QLD (Mjöberg) SM. Type examined.

NOTES ON TYPE. Unlike Chopard's description, the hind femur of the type has no brown bands on it. Micropterous. Subgenital plate black, but rest of venter is brown. Dorsal abdomen black. Pronotum and head all brown; legs yellow-brown and more or less unicolorous. Eyes dark brown. Foretibiae without tympana. Tegmina with 6 straight, parallel veins. Specimen from Herberton with cotype label does not belong to this species but probably to *T. meekappa*.

RANGE. Northcentral coastal QLD.

RECOGNITION. Differs from *T. infuscata* in having pronotum uniform yellow. Head, pronotum, and legs pale brown. FW and abdomen brown to black, but longitudinal veins of FW pale. FW's dark brown on lateral field. Dorsal and ventral surface of abdomen brown to dark brown. Male genitalia as in Fig. 179O. Body length 5.2–5.5 mm. Ovipositor ca. 1.67 times as long as pronotum. Central portion of tergum beneath FW's sometimes yellowish in females.

HABITAT. Collected by sweeping in vegetation along streams.

SPECIMENS. Holotype ♂ SM. A-19 1♂ 1♀ ANC. A-23 1♂ 1♀ ANC. Lacey's creek, Mission Beach, near Tully, QLD, 21 v 1970 (Monteith) 2♂ UQC. Cardstone, Near Tully Falls, QLD, 9 i 1962 1♂ BM.

Trigonidium infuscata (Chopard)

Metioche infuscata Chopard 1925: 37. Holotype ♂, Mt. Tambourine, QLD, SM. Holotype bears: "Mt. Tambourine; Queensl. Mjöb; type; *Metioche infuscata* Chop., L. Chopard type."

RANGE. Extreme southeastern QLD and possibly northcentral coastal QLD.

RECOGNITION. Differs from *T. parinervis* in having sides of head and pronotum darker than dorsum. Male micropterous. Sides of pronotum and lateral

fields of tegmina black. Dorsal field of tegmina yellowish. Dorsal pronotum brownish, with fairly bright yellow bar between it and black part. Top of head brownish in middle, with thin brown line extending down middle of rostrum. Face with black bar across it. Basal two antennal segments black. Ventral abdomen black. Length of body 5.5–6 mm.

HABITAT. Probably lush grasses.

SPECIMENS. Holotype ♂ SM. QUEENSLAND: Clyton Gully, 2½ mi E Cunningham's Gap, 1 vi 1966 (Liepa) 1♀ ANC. Rocky Creek 7 mi N Atherton, 3 v 1967 (Colless) 1♀ ANC. NEW SOUTH WALES: Depot Beach, 10 mi NE Bateman's Bay, 30 xii 1967 (Common) 1♀ ANC.

Trigonidium lalwinya n. sp., Fig. 179K

RANGE. Cooloola National Park, southeastern QLD.

RECOGNITION. Males: Genitalia as in Fig. 179K. Face black except most of clypeus and labrum. Side of head black. Top of head reddish-brown. Scape light brown. Pronotal disk dark brown and with pale area near lateral border and in front half. FW's black on lateral field and most of dorsal field, but with whitish area in front central part and brown, more transparent area in posterior and central part. Venter of thorax pale. Venter of abdomen black. Body length ca. 5 mm; femur III 4.5 mm.

Females: Similar to male in size and color but last few segments of abdomen pale brown. Ovipositor 2.04 times as long as femur III and 1.8 times as long as pronotum.

HOLOTYPE. ♂, 26.00S 153.09E, stop 81, near Freshwater Lake, Cooloola National Park, QLD, 4 iv 1978 (Rentz, Rentz) ANC.

HABITAT. Probably lush grasses.

SPECIMENS. Holotype ♂ ANC. QUEENSLAND: same data as holotype, 3♀ ANC. Near Poona Lake otherwise same data as holotype 1♂ 1♀ ANC.

◆ **MEEKAPPA GROUP**

The group includes six species which can be identified on the basis of Table 15 and the following key. The group differs from the Australiana and Parinervis groups principally by having the body almost uniformly yellowish or pale brown. One species, however, *T. killawarra*, has lateral pale stripes similar to those in *Balamara albovittata* and the two species may be more closely related than indicated by the present grouping.

KEY TO SPECIES OF MALES IN MEEKAPPA GROUP

1. Dorsum of FW's with pale stripe along each lateral margin *killawarra*
- Dorsum of FW's without pale stripes along lateral margins 2
2. Membrane of FW light brown or brown, distinctly darker than longitudinal veins. Subgenital plate dark brown or black or with median brown line 3
- Membrane of FW about same color as longitudinal veins or at most slightly darker. Subgenital plate about same color as preceding segments 5
3. Dorsum of abdomen black. Genitalia as in Fig. 179F
- *canara*
- Dorsum of abdomen yellowish or at most light brown.
- Genitalia not as above 4
4. Disk of pronotum darker through central region. Genitalia as in Fig. 179C. Subgenital plate dark brown
- *bundilla*
- Disk of pronotum not darker through central region.
- Genitalia as in Fig. 179L. Subgenital plate sometimes with median brown streak, sometimes pale *amarina*
5. Genitalia as in Fig. 179M *meekappa*
- Genitalia as in Fig. 179B *goobita*

Trigonidium meekappa n. sp., Figs. 177B, 179MN

RANGE. Northern coastal QLD.

RECOGNITION. Body color entirely yellow. Male genitalia as in Fig. 179MN. Veins of FW whitish, lighter than surrounding cells. Body length 5.0–5.5 mm. Holotype measurements: Pronotum 1.48 times as wide as long. FW 3.22 times as long as pronotum and .76 times as long as femur III. Femur III 0.98 times as long as tibia III. Body length 5.17 mm; FW length 2.96 mm; femur III 3.91 mm; cerci ca. 1.6 mm.

HOLOTYPE. ♂, A-19, Crystal Creek at Route 1, 41 miles N of Townsville, QLD, 31 vii 1968, ANC.

HABITAT. Collected by sweeping in vegetation along streams.

SPECIMENS. Holotype ♂ ANC. Same data as holotype 3♂ 1♀ ANC. A-35 1♂ ANSP. A-23 1♂ ANC. A-293 1♂ ANC. QUEENSLAND: Bamaga, Cape York, 15 vi 1960 (Monteith) 1♂ ANC. Rocky Creek, 7 mi N Atherton, 3 v 1967 (Colless) 1♂ ANC. 13 mi SW Ingham, 20 iii 1961 (Straatman) 1♀ ANC. Herberton (Mjöberg) 1♂ PM. NORTHERN TERRITORY: 47 mi SW by W of Daly River Mission, 14.11S 130.08E, 6 ix 1968 (Mendum) 2♀ ANC.

Trigonidium goobita n. sp., Fig. 179B

RANGE. Type locality in southcentral coastal QLD.

RECOGNITION. Body color entirely pale yellow. Male genitalia as in Fig. 179B. FW entirely pale;

cells about as pale as the veins. Body length ca. 6 mm. Holotype measurements: FW 0.69 times as long as femur III. Femur III 1.04 times as long as tibia III. Body length 6.17 mm; femur III 4.1 mm; cerci 2.75 mm.

HOLOTYPE. ♂, A-299, bank of Fitzroy River at Rockhampton, QLD, 6 xi 1968, ANC.

HABITAT. Collected in tall vegetation along banks of Fitzroy River.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 5♂ 4♀ ANC.

Trigonidium bundilla n. sp., Fig. 179C

RANGE. Northern coastal ranges of QLD.

RECOGNITION. Body color yellow. Subgenital plate dark brown. Pronotal disk brownish over central area and with pale median line. Genitalia as in Fig. 179C. Ovipositor of females ca. 1.74 times as long as pronotum. Body length ca. 5.2 mm for males; ca. 6.0 mm for females. Holotype measurements: Pronotum 1.32 times as wide as long. FW 3.00 times as long as pronotum and 0.73 times as long as femur III. Femur III as long as tibia III. Body length 5.17 mm; femur III 4.1 mm; cerci 2.4 mm.

HOLOTYPE. ♂, A-29, a few miles east of Kuranda, QLD, 4–5 viii 1968, ANC.

HABITAT. In lush grasses on hillside in generally forested area.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 4♂ 3♀ ANC. QUEENSLAND: Kuranda Range State Forest, 7–8 km Black Mtn Road, 20 iv 1967 (Colless) 2♂ 1♀ ANC. Mossman Gorge, 21 iv 1967 (Colless) 1♂ 1♀ ANC. 2 mi N Cooroy, 15 v 1970 (Liepa) 1♀ ANC. Mt Edith, 4–7 mi off Danbulla Road, QLD, 27 iv 1967 (Colless) 1♀ ANC.

Trigonidium armarina n. sp., Fig. 179L

RANGE. Northern NT and northeastern Cape York.

RECOGNITION. Body color yellowish. Very similar to *T. meekappa* but parallel veins of forewing nearly white while surrounding cells brown. Several pale cross-veins also evident. Genitalia as in Fig. 179L. Tergum brownish; darker distally. Sternum yellowish, but subgenital plate brown centrally; distal extremity somewhat pointed. Holotype measurements: Pronotum 1.5 times as wide as long. FW 3 times as long as pronotum and 0.69 times as long as femur III. Femur III 0.98 times as long as tibia

III. Body length 5.6 mm; femur III 4.2 mm; cerci 2.2 mm.

HOLOTYPE. ♂, A-45, forest edge in the vicinity of Iron Range, Cape York, QLD, 11 viii 1968, ANC.

HABITAT. Herbaceous vegetation 3–4 feet above ground on edge of rain forest.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 2♂ 3♀ ANC. A-17 1♀ ANC. Lockerbie, Cape York, QLD, 6–15 vi 1969 (Monteith) 9♂ 5♀ uqc. Iron Range, QLD, 14 vi 1971 (Feehan) 1♂ 1♀ ANC. Same locality, 17 viii 1971 (Jenkins) 1♀ ANC. 19 mi W by N of Dorisvale HS, NT, 14.28S 131.03E, 21 ix 1968 (Mendum) 1♀ ANC.

Trigonidium killawarra n. sp., Fig. 179G

RANGE. Type locality in central coastal QLD.

RECOGNITION. Head and eyes yellowish. Top of head with 4 faint reddish lines running longitudinally. Antennae and palpi yellowish. Pronotum yellow with small, faint reddish marking. FW's brown but with broad yellow bands along dorso-lateral edge and with yellow veins (compare with *B. albovittata* which has similar pale wing stripes). Legs pale brown to yellow. Abdomen dark dorsally, yellow beneath, and with dark brown subgenital plate. Genitalia similar to *T. canara* from same locality (Fig. 179G). Holotype measurements: FW 2.87 times as long as pronotum and 0.67 times as long

as femur III. Body length ca. 4.58 mm (abdomen somewhat shrunken); femur III 3.92 mm; cerci 2.17 mm.

HOLOTYPE. ♂, Byfield, QLD, 10 v 1955 (Common, Norris) ANC.

HABITAT. Unknown; probably herbaceous vegetation.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♀ ANC.

Trigonidium canara n. sp., Fig. 179F

RANGE. Type locality in central coastal QLD.

RECOGNITION. Head slightly reddish, pronotum and legs yellowish, antennae light brown. FW's with yellow veins and pale brown membrane. Dorsum of abdomen black. Sternum of abdomen yellow except subgenital plate dark brown to black. Male genitalia as in Fig. 179F. Holotype measurements: Pronotum 1.35 times as wide as long. FW 2.87 times as long as pronotum and 0.67 times as long as femur III. Femur III 0.99 times as long as tibia III. Body length ca. 5 mm; femur III 3.9 mm; cerci 2.2 mm.

HOLOTYPE. ♂, Byfield, QLD, 10 v 1955 (Common, Norris) ANC.

HABITAT. Unknown; probably herbaceous vegetation.

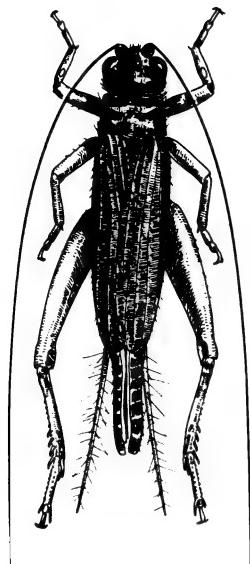
SPECIMENS. Holotype ♂ ANC.

SUBFAMILY PENTACENTRINAE

The subfamily Pentacentrinae includes 48 species arranged in 14 genera and five tribes. *Pentacentrus*, the largest genus, contains 25 known species. Four genera are African, four New World, and five are found in eastern Asia, Indonesia, Pacific Islands, and Australia. *Pentacentrus* extends from Ceylon (one species) and Formosa (one species) to the Philippines (one species), New Guinea (five species), and Australia (two species); 15 species are Indonesian.

RECOGNITION. The members of the subfamily are grouped principally on the basis of the antennal position "beneath the middle of the face." This appears to us to be a matter of perception. Since the dorsum of the head is flat it is possible for the head to tilt downwards causing the antennae to appear low (Fig. 183C). In fact the antennae are positioned

as in all other crickets (Fig. 183D). The heads of some dorso-ventrally flattened Gryllinae also appear to have the antennae positioned low, but if the main region of the head between and just back of the eyes is viewed as the dorsum then the antennal position appears normal. The presence of flat heads in other subfamilies means that this characteristic is by itself not a useful way to define the Pentacentrinae. But a combination of characteristics can be used to define the subfamily and the following features can be used to separate the two Australian members from all other groups: (a) Small, body length ca. 10 mm; femur III ca. 5 mm; brown to blackish insects with pale brown legs. (b) Head strongly flattened (Fig. 183AB). (c) Male FW's without stridulum. (d) FW's extending at least to end of abdomen. (e) HW's extending well beyond

FIG. 181. *Pentacentrus velutinus* ♂.

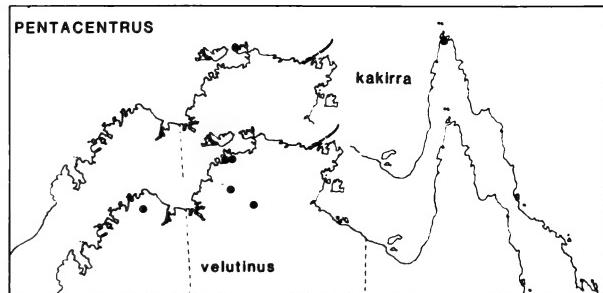
FW's. (f) Inner tympanum large; outer one absent or represented by small dimple. (g) Tibia III with two rows of small spines above spurs and sometimes between upper two spurs and with 2 inner and 3 outer subapical spurs (Fig. 183EF). (h) Sc vein on FW without any visible branching points, all veins on lateral field run parallel to upper margin.

Genus PENTACENTRUS Saussure

Pentacentrus Saussure 1877: 399. Type species: *Pentacentrus pulchellus* Saussure 1877: 401, Ceylon, by monotypy.

When Saussure (1877) distinguished the Legion Pentacentrites to include the new genus and species *Pentacentrus pulchellus* from Ceylon, he noted that "Cette division n'est formée que pour recevoir un genre aberrant que offre dans la tribu une exception embarrassante, soit par l'armure de ses tibias postérieurs que ne posséde que 5'éperons au lieu de 6, soit aussi par les formes du corps et en particulier par celle de la tête qui n'a pas son semblable dans le reste des Gryllides."

Since Saussure, members of the group have been distinguished from the Gryllinae largely by the low position of the compound eyes, about two-thirds of the distance from the vertex to the tip of the labrum. Emphasis on this character was evidently responsible for Chopard (1951, 1968) including *Eurygrylodes* in the Pentacentrinae, though its genitalia and

FIG. 182. *Pentacentrus* distributions.

other similarities to desert Gryllinae in Australia indicate that it is independently convergent from Gryllinae. Some members of the subfamily have spines proximal to the spurs on the hind tibiae.

RECOGNITION. Small brown to dark brown insects, superficially similar to some Trigonidiinae such as *Amusurgus* and *Nemobiinae*. Head, pronotum and FW's entirely brown or dark brown, legs pale. Hind tibiae with small spines above spurs (never present in Trigonidiinae or Nemobiinae). See subfamily recognition for other characters.

Pentacentrus velutinus Chopard, Figs. 181, 183CDG

Pentacentrinus velutinus Chopard 1937: 115. Holotype ♀, Marakai, Northern Territory, May 1931 (E. Handschin) Basle Museum.

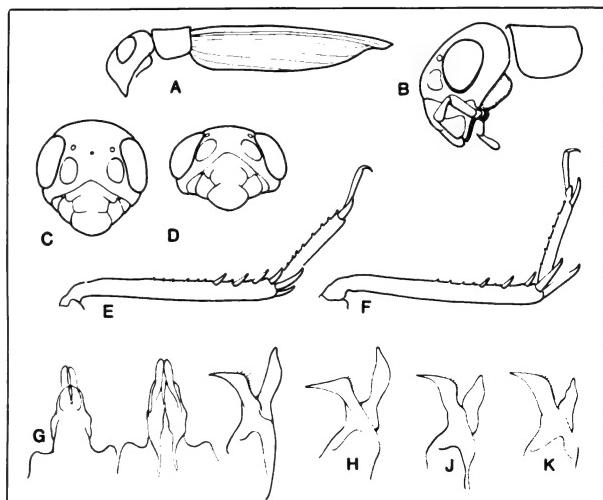


FIG. 183. *Pentacentrus*. A, *Pentacentrus* profile; B, *kakirra* ♂ Lockerbie; C, D, two views of *velutinus* face (see A); E, *kakirra* outer tibia III; F, *kakirra* inner tibia III; G, *velutinus* ♂ genitalia; H, *kakirra* Dorisvale HS NT; J, *kakirra* Lockerbie QLD; K, *kakirra*, Cobourg Pen. NT.

Pentacentrus australianus Chopard 1951: 445. Holotype ♀, Burnside, NT [Type label says NT, Chopard 1951 says South Australia] May 1931 (E. Handschin) SAM. Type examined.

NOTE. In the Australian gazetteer we cannot find a Burnside in NT, only in SA and central QLD.

RANGE. Northwestern WA and northern NT.

RECOGNITION. See subfamily and generic recognition. Differing from *P. kakirra* in male genitalia (Fig. 183G). Body length ca. 10 mm; femur III length ca. 5 mm.

HABITAT. Not known; usually taken at lights.

SPECIMENS. Holotype ♀ Basle Museum. Burnside, NT (Handschin) 1♀ SAM. Holms Jungle, 15 km NE Darwin, 14 iii 1961 (Gressitt) 1♀ BISH. Tindal, 8 mi ESE Katherine, NT, 12 xii 1967 (Vestjens) 4♂ 3♀ ANC. 14.13S 130.55E, 34 mi NW Dorisvale HS, NT, 14 viii 1968 (Mendum) 1♂ ANC. 14.39S 126.57E, Drysdale R, Kimberley dist, WA, 21 viii 1975 (Common, Upton) 1♂ ANC.

OTTE AND ALEXANDER

Pentacentrus kakirra n. sp., Fig. 183BEFHJK

RANGE. Extreme northern NT and Cape York Peninsula.

RECOGNITION. Males: Very similar to *P. velutinus* but male genitalia different (Fig. 183HJK). Body length to end of HW ca. 10 mm; HW length ca. 6.0 mm; femur III length ca. 5 mm; tibia III length ca. 3.7 mm; cercal length ca. 4.5 mm. Ovipositor 0.73 times as long as femur III.

HOLOTYPE. ♂, 11.07S 132.08E, Smith Point, Cobourg Peninsula, NT, 19 ii 1977 (R. C. Lewis) ANC.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 2♂ ANC. Lockerbie, Cape York, QLD, 10 vi 1969 (Monteith) 1♂ 1♀ UQC.

SUBFAMILY PHALANGOPSINAE

This subfamily includes 60 genera and about 265 species. In Australia three genera and 32 species are represented, of which one genus and 23 species are here newly described.

Phalangopsinae are distributed through most tropical regions and many species are cavernicolous.

These slender-legged agile crickets are found on rocks and on the surfaces of downed logs or low on the trunks of dead trees. We have taken them along rocky cliffs, in old wells, under wooden bridges, in boulder-strewn stream beds, and rarely in leaf litter in dry eucalyptus forests; A. M. Richards has taken them frequently in caves. Both sexes and all stages can be located where males are heard or colonies are suspected, simply by searching out such locations and examining them, especially at night with a light. These crickets are so quick that they are likely to escape unless one uses a large catching jar inverted over them, or else claps a hand over them risking damage to the specimen.

In many respects these crickets live like certain Gryllacrididae, resembling them in form and behavior as well as habitat. In some habitats, such as rocky arid locales, it is easy to believe that their almost unbelievable quickness has evolved in some large part in response to lizard predation.

Chopard (1951) erected the genus *Endotaria* for a single apterous male from New South Wales. We discovered two additional species from NSW and Queensland. Curiously Chopard's species, *E. aptera*, bears a tibial auditory organ, but *E. tait-pulluna* and *E. yelta* do not. In all other Australian members of the subfamily the males have tegmina bearing acoustical apparatus, while the females are apterous. Chopard placed all of the winged species in the genus *Endacusta*, but we have placed several of these species into a new genus *Tathra*, a group, found mostly in eastern rain forests, which resembles *Endotaria aptera* in all attributes except the presence of long, smoothly rounded male tegmina bearing a stridulatory apparatus. We disagree, however, with his conclusion that the first-described of these species, *amplipennis* Chopard, belongs to the genus *Parendacustes*, the type of which is from Sumatra.

RECOGNITION. (Figs. 184, 195, 200.) Head with bristles on dorsum in vicinity of ocelli. Tibia III with small spines above subapical spurs and also between spurs. Middle tarsal segment small, without large adhesive pads as in some Eneopterinae. Legs very long and slender, hind femora held akimbo in life. Females entirely wingless. Male HW's never apparent. Tibiae I and II strongly banded.

KEY TO GENERA

1. Both sexes without wings. With or without auditory tympana *Endotaria*
Males with FW's. Auditory tympana present 2
 2. FW usually at least 3 times as long as pronotum (except *pilipennis*). Frontal rostrum usually relatively broader (Fig. 195). Longest inner spur of tibia III less than half as long as basitarsus III. Mirror often divided by complete dividing veins (Fig. 199). File with 100–400 teeth *Tathra*
FW always less than 2.5 times as long as pronotum and usually less than 1.8 times as long. Frontal rostrum relatively narrow (Fig. 184). Longest inner spur of tibia III at least half as long as basitarsus III. Mirror not divided as above (Fig. 194) *Endacusta*
-

Genus **ENDACUSTA** Brunner
von Wattenwyl

Endacusta Brunner von Wattenwyl 1873: 167. No species was included in the genus. Type species: *Endacustes irroratus* Saussure 1878: 436, Subsequent designation by Kirby 1906.

Chopard (1968) uses the name *Endacustes*, although he used *Endacusta* in 1951, and he makes the change without comment. He also notes that Brunner did not designate a type. Eight of the 11 species discussed by Chopard (1951) belong in this genus, the other 3 in the new genus *Tathra*. We also add here 14 new species. *Endacusta angulifrons* is not an Australian species and is known only from Lord Howe Island.

RECOGNITION. Fig. 184. Arid-land species of Australian Phalangopsinae, mostly medium large forms with variegated pattern containing more light than dark coloration, and with dark coloration frequently reddish rather than blackish as in most *Tathra* species. Tibiae I with only inner tympana. FW's of males short (always less than twice as long as pronotum) and usually exposing two or three abdominal tergites. Frontal rostrum narrow, rear ocelli separated by less than twice their diameter. Longest apical spur on hind tibia more than $\frac{1}{3}$ length of basitarsus. Face usually with pair of dark lines descending from between antennal sockets and with broader to dark bands running from lower edge of eyes onto mandible. Tibia III usually with 4 inner and 4 outer subapical spurs.

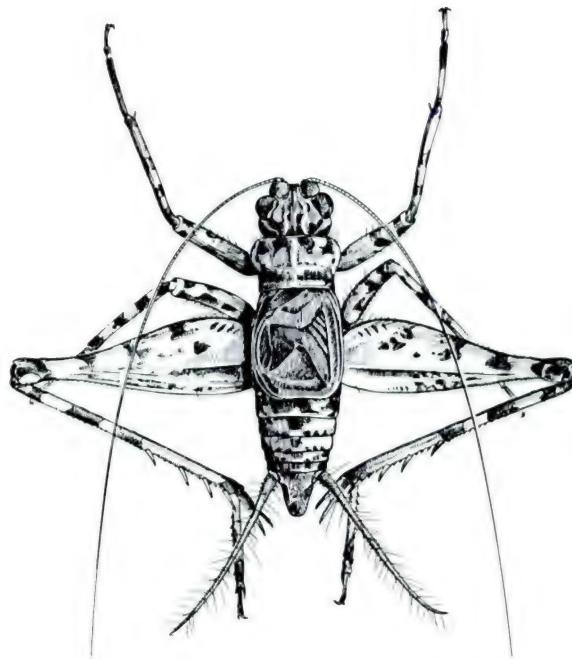


FIG. 184. *Endacusta pindana*.

KEY TO ENDACUSTA MALES

NOTE. It is essential to dissect out and examine the male genitalia when identifying the members of this genus. Males of *E. paraboora* are not known. *E. cycloptera* is not included.

A. QUEENSLAND AND NEW SOUTH WALES SPECIES

1. FW slightly concave along posterior margin (Fig. 194A–F). Genitalia as Fig. 187EF 2
FW rounded along posterior margin (Fig. 194H–V). Genitalia not as above 3
2. Femur III 18–20 mm long. File with 88–120 teeth ... *major*
Femur III 11–16 mm long. File with 45–70 teeth *pindana*
3. Pronotum and head mostly dark on dorsum (Fig. 192AB). Antennae dark and with intermittent pale rings 4
Pronotum and head with large pale areas. Antennae not as above (except *E. minka*) 5
4. FW about 2 times as long as pronotum. Genitalia as in Figs. 189A or 187C 10
FW about 1.6 times as long as pronotum. Genitalia as in Fig. 188H. Dorsum of head with distinct longitudinal pale stripes (Fig. 192B) *kirrimurra*
5. FW about 2 times as long as pronotum. Femur I more than 3 times as long as pronotum. Male genitalia as in Fig. 187D. File with ca. 55 teeth. (NSW) *cocaparae*

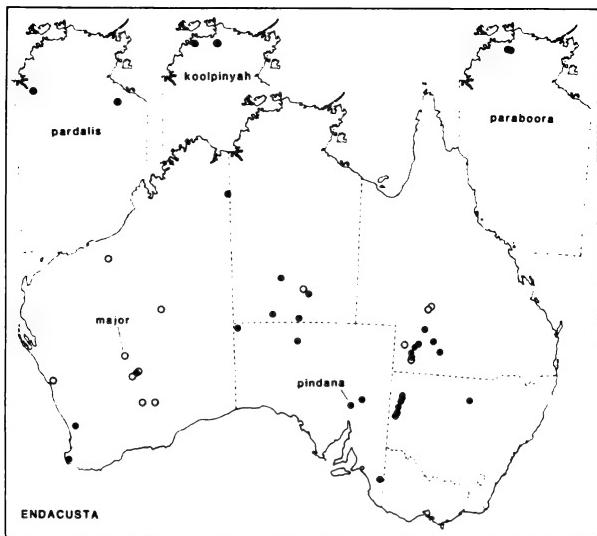
TABLE 16. Comparison of *Endacusta* species (*cycloptera* and *wollia* not included for lack of information).

	Distribution	Males			Females		
		Number file teeth	Femur III length	Femur I length pronotal length*	FW length pronotal length*	Femur III length ovipositor length*	Femur III length cercal length*
<i>major</i>	WA, QLD, NT	88–120 $\bar{x} = 101$ n=15	18–20	3.1	1.9	1.35–1.60	0.95–1.10
<i>pindana</i>	central Australia	45–70 $\bar{x} = 54$ n=29	11.5–16	2.5	2.1	1.45–1.78	1.15–1.30
<i>minor</i>	SA	75 n=1	9.5	2.7	1.9	females not seen	
<i>koonaldia</i>	SA	75–83 n=4	ca. 18	2.5	1.7	0.70–0.72	ca. 1.13
<i>irrorata</i>	SA	63–70 n=3	13–16	2.9	1.6	1.44–1.60	
<i>tibooburra</i>	NSW	78 n=1	18	2.5	1.5	0.98–1.08	ca. 1.0
<i>australis</i>	SA, VIC	91–99 n=2	15.5	2.7	1.7	0.69	1.3–1.5
<i>pardalis</i>	NT	81 n=1	14.8	2.6	1.6	1.1	0.92
<i>koolpinya</i>	N NT	94 n=1	ca. 19	2.2–2.7	1.8	0.97–1.0	0.60–0.78
<i>parabooora</i>	N NT	males not known				2.25	0.75
<i>kirrimurra</i>	SE QLD	95 n=1	12.5	2.3	1.6	1.09	ca. 1.0
<i>mareeba</i>	NE QLD	70 n=1	15	2.4	1.7	females not known	
<i>mjöbergi</i>	SE QLD	86 n=1	12	2.3	2.0	females not known	
<i>yarramani</i>	SE QLD	84–94 n=5	ca. 10	2.0	1.8	0.09–1.0	1.0
<i>cocaparae</i>	NSW	55 n=1	22	3.4	2.0	females not known	
<i>morillum</i>	NE QLD	79 n=1	14.5	2.3	1.6	females not known	
<i>minka</i>	SE QLD	57 n=1	11.7	2.1	1.8	females not known	
<i>lilla</i>	E QLD	105 n=1	18	2.8	1.4	females not known	
<i>eurimbula</i>	E QLD	60–75 n=3	11–12	2.2	2.0	1.0	1.0

* Approximations.

- FW 1.8 or less times as long as pronotum. Femur I less than 2.8 times as long as pronotum. Male genitalia not as above 6
6. Head distinctly narrower than rear of pronotum. Dor-

- sum of pronotum patterned as in Fig 192M. Genitalia as in Fig. 188D *tibooburra*
- Head about as wide as rear of pronotum. Dorsum of pronotum and genitalia not as above 7

FIG. 185. *Endacusta* distributions.

7. Genitalia as in Fig. 188K. Pronotum and head patterned as in Fig. 192R. File with ca. 100 teeth *lilla*
Genitalia, pronotum and head not as above. File with fewer than 85 teeth 8
8. Genitalia as in Fig. 188J or Fig. 189B 11
Genitalia, head and pronotum not as above 9
9. Genitalia as in Fig. 187A. Head and pronotum as in Fig. 192D *mareeba*
Genitalia as in Fig. 187B. Head and pronotum as in Fig. 192Q *morillum*
10. Genitalia more as in Fig. 187C *mjöbergi*
Genitalia more as in Fig. 189A *yarramani*
11. Genitalia more as in Fig. 188J *minka*
Genitalia more as in Fig. 189B *eurimbula*

B. NORTHERN TERRITORY SPECIES

1. FW slightly concave along posterior margin (Fig. 194A–F). Genitalia as in Fig. 187EF go to 1 under A
FW rounded along posterior margin (Fig. 194H–V). Genitalia not as above 2
2. Femur III 18 mm or more in length. Head and pronotum patterned as in Fig. 192N. Genitalia as in Fig. 187H *koopinya*
Femur III less than 16 mm in length. Head and pronotum patterned as in Fig. 192F. Genitalia as in Fig. 188E *pardalis*

C. SOUTH AUSTRALIA AND WESTERN AUSTRALIA

1. FW slightly concave along posterior margin (Fig. 194A–F). Genitalia as in Fig. 187EF go to 1 under A
FW rounded along posterior margin (Fig. 194H–V). Genitalia not as above 2
2. Femur III 10 mm or less in length. Genitalia as in Fig. 188C *minor*
Femur III more than 12 mm in length. Dorsum of head not as above. Genitalia not as above 3

3. Head and pronotum patterned as in Fig. 192M. Genitalia as in Fig. 188D *tibooburra*
Head, pronotum, and genitalia not as above 4
4. Pronotum with large dark areas on disk (Fig. 192E). File with ca. 100 teeth. Genitalia as in Fig. 188A *australis*
Pronotum with smaller spots on disk (Fig. 192OP). File with fewer than 85 teeth. Genitalia not as above 5
5. Femur III 16 mm or less in length. Femur I about 2.9 times as long as pronotum. Genitalia as in Fig. 188B *irrorata*
Femur III ca. 18 mm long. Femur I about 2.5 times as long as pronotum. Genitalia as in Fig. 188F *koonaldia*

KEY TO *ENDACUSTA* FEMALES

NOTE. Females of the following species are not known: *E. minor*, *E. mareeba*, *E. mjöbergi*, *E. cocoparae*, *E. morillum*, *E. lilla*, *E. cycloptera*, *E. wollia*.

A. QUEENSLAND SPECIES

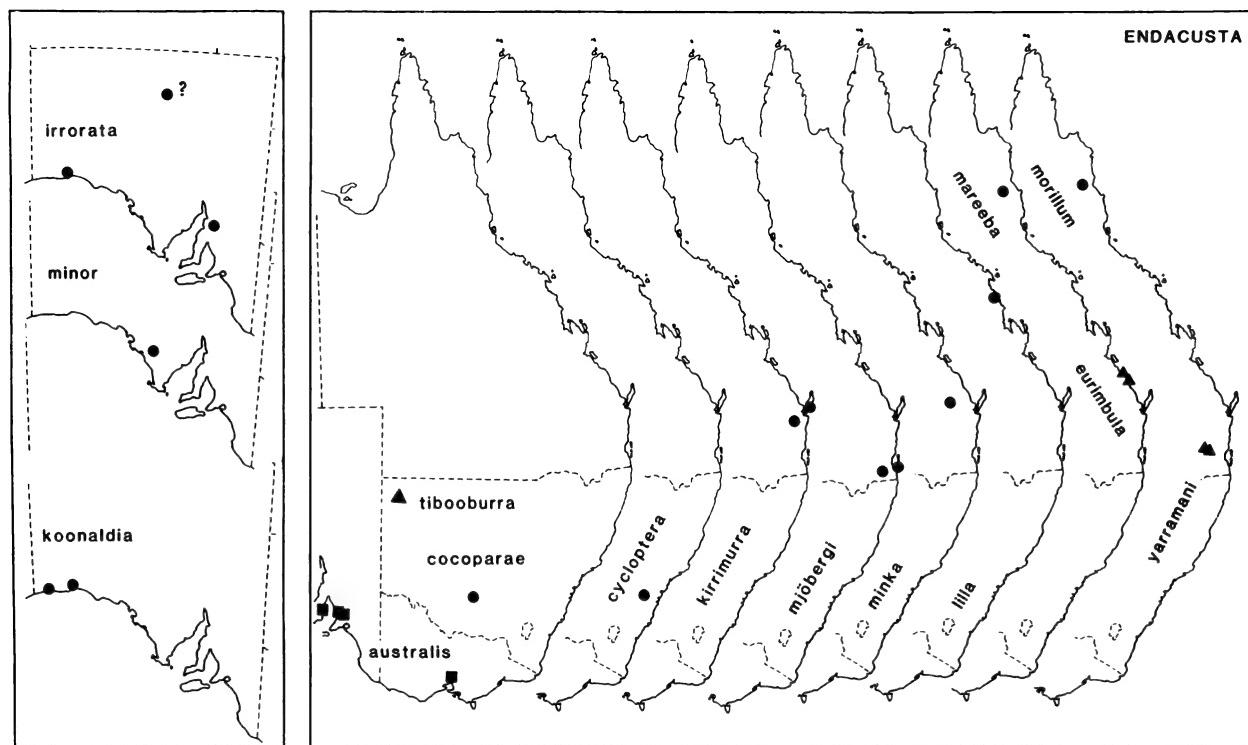
1. Femur III about 1.1 times as long as ovipositor (eastern QLD) *kirrimurra*
Femur III more than 1.3 times as long as ovipositor 2
2. Femur III less than 17 mm long. Femur I about 2.5 times as long as pronotum. Femur III 1.15–1.30 times as long as cerci and 1.45–1.78 times as long as ovipositor *pindana*
Femur III more than 18 mm long. Femur I about 3 times as long as pronotum. Femur III 0.95–1.10 times as long as cerci and 1.35–1.60 times as long as ovipositor *major*

B. NORTHERN TERRITORY SPECIES

1. Femur III more than 1.3 and less than 1.8 times as long as ovipositor go to 2 under A
Femur III less than 1.1 or more than 2.0 times as long as ovipositor 2
2. Tibia I without auditory tympanum. Femur III more than 2 times as long as ovipositor *parabura*
Tibia I with tympana. Femur III less than 1.1 times as long as ovipositor 3
3. Dorsum of pronotum as in Fig. 192F. Tibia I banded as in Fig. 193F *pardalis*
Dorsum of pronotum as in Fig. 192J. Tibia I banded as in Fig. 193G *koopinya*

C. SOUTH AUSTRALIA AND WESTERN AUSTRALIA SPECIES

1. Ovipositor much longer than femur III 2
Ovipositor about as long as femur III or shorter 3
2. Dorsum of pronotum and head as in Fig. 192O. Femur III less than 1.2 times as long as cerci *koonaldia*
Dorsum of pronotum and head as in Fig. 192E. Femur III 1.3–1.5 times as long as cerci *australis*
3. Ovipositor about as long as femur III. Dorsum of pronotum as in Fig. 192M *tibooburra*
Ovipositor distinctly shorter than femur III 4
4. Dorsum of pronotum more spotted than banded (Fig. 192P) and femur III less than 17 mm long *irrorata*

FIG. 186. *Endacusta* distributions.

Dorsum of pronotum with large dark marks or bands (Fig. 192HL) or femur III more than 17 mm long go to 2 under A

***Endacusta major* Chopard, Figs. 187E, 190, 191J, 192L, 193CJM, 194DEF**

Endacusta major Chopard 1951: 453. Holotype ♂, Innamincka, SA, SAM. Type examined.

RANGE. Widespread through interior of continent.

RECOGNITION. Genitalia (Fig. 187E) almost identical to those of *E. pindana*. Males of the two species may be distinguished by size and number of file teeth (Fig. 190); females may be distinguished by size and femur III length relative to cercal length (Fig. 190). The two species also differ in song. Subgenital plate as in Fig. 193M. FW with slightly concave posterior margin (as in *E. pindana*). Harp with 6–8 veins. Mirror incompletely subdivided by veins in posterior half (Fig. 194D). Surface of FW slightly to moderately hairy. Legs marked as in Fig. 193C. File with 88–120 teeth ($n=15$), mean = 101. Body length 19–26 mm; femur III length 18–20 mm; FW ca. 1.94 times as long as pronotum.

Females: Femur III 1.35–1.60 times as long as ovipositor, and 0.95–1.10 times as long as cerci. Females larger and with longer ovipositors than *E. pindana* (Fig. 190).

SONG. Fig. 197. Long trills, separated by brief intervals of less than a second.

	p/s	kps	°C
A-459	n = 3 88–96	5.0–5.1	33
A-619	71	4.7	26
A-884	n = 3 97–99	4.2–4.7	27

HABITAT. Usually on rock faces and in rock crevices, and sometimes on rock reservoirs.

SPECIMENS. Holotype ♂ SAM. A-450 1♂ ANC. WESTERN AUSTRALIA: 30.47S 121.27E Kalgoorlie, 16 ii 1978 (Rentz, White) 1♂ ANC. 28.41S 121.03E 3 km NNE Mt. Ross, NW Leonard, 18 ii 1978 (Rentz, White) 1♂ 2♀ ANC, 1♂ UM. 28.47S 121.31E 1 km S Malcolm 19 ii 1978 (Rentz, White) 8♂ 3♀ ANC, 2♂ 1♀ ANSP. 3 km SE Mt. Bryan, SSW Wiluna, 13 i 1972 (White) 4♂ 1♀ ANC. Minnie Creek, near Virginia Range, 29–31 i 1967 (White) 2♂ 2♀ ANC. Karonie, 18 iv 1967 (Wolve) 1♀ ANC. Mt. Kenneth, ii 1961 (Douglas) 2♂ 2♀ WAM. Kalgoorlie, 1♀ UM. QUEENSLAND: 3 mi N Durham Downs HS, 18 iv 1966 (Chinnick, Lewis) 1♀ ANC.

LISTENING RECORDS. A-462.

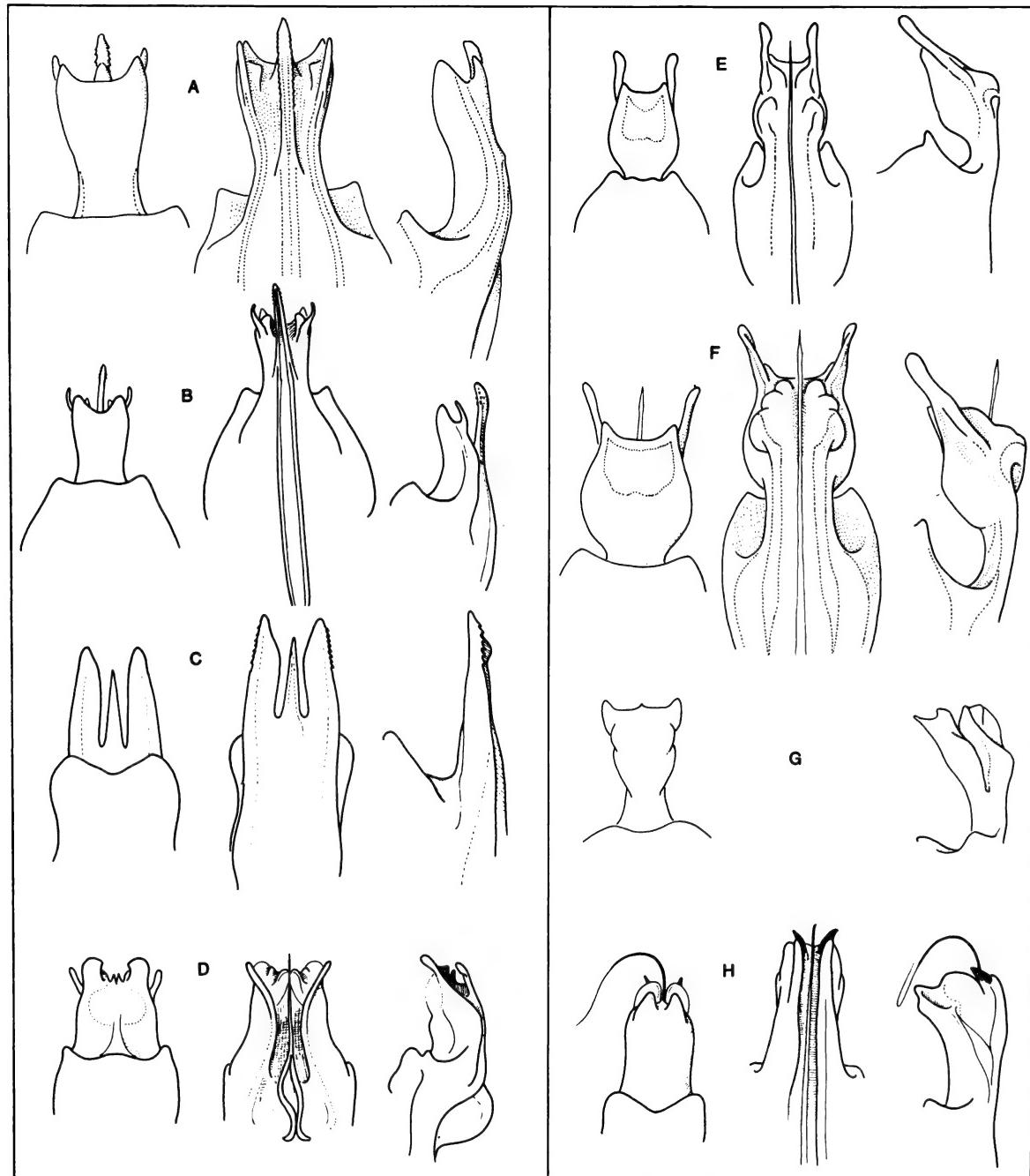


FIG. 187. *Endacusta* male genitalia (dorsal, ventral, and lateral views left to right). A, *mareeba* A-314; B, *morillum* holotype; C, *mjöbergi* Stradbroke Island; D, *cocoparae* holotype; E, *major* A-450; F, *pindana* holotype; G, *cycloptera*; H, *koolpinya*.

***Endacusta pindana* n. sp., Figs. 184, 187F, 190, 194ABC**

RECOGNITION. Genitalia almost identical to those of *E. major* (Fig. 187F). The two species differ in

size and number of file teeth (Fig. 190). Subgenital plate similar to *E. major*. File with 49–70 teeth, $n=27$, mean = 54. Holotype measurements: Pronotum 1.71 times as wide as long. FW 2.14 times as long

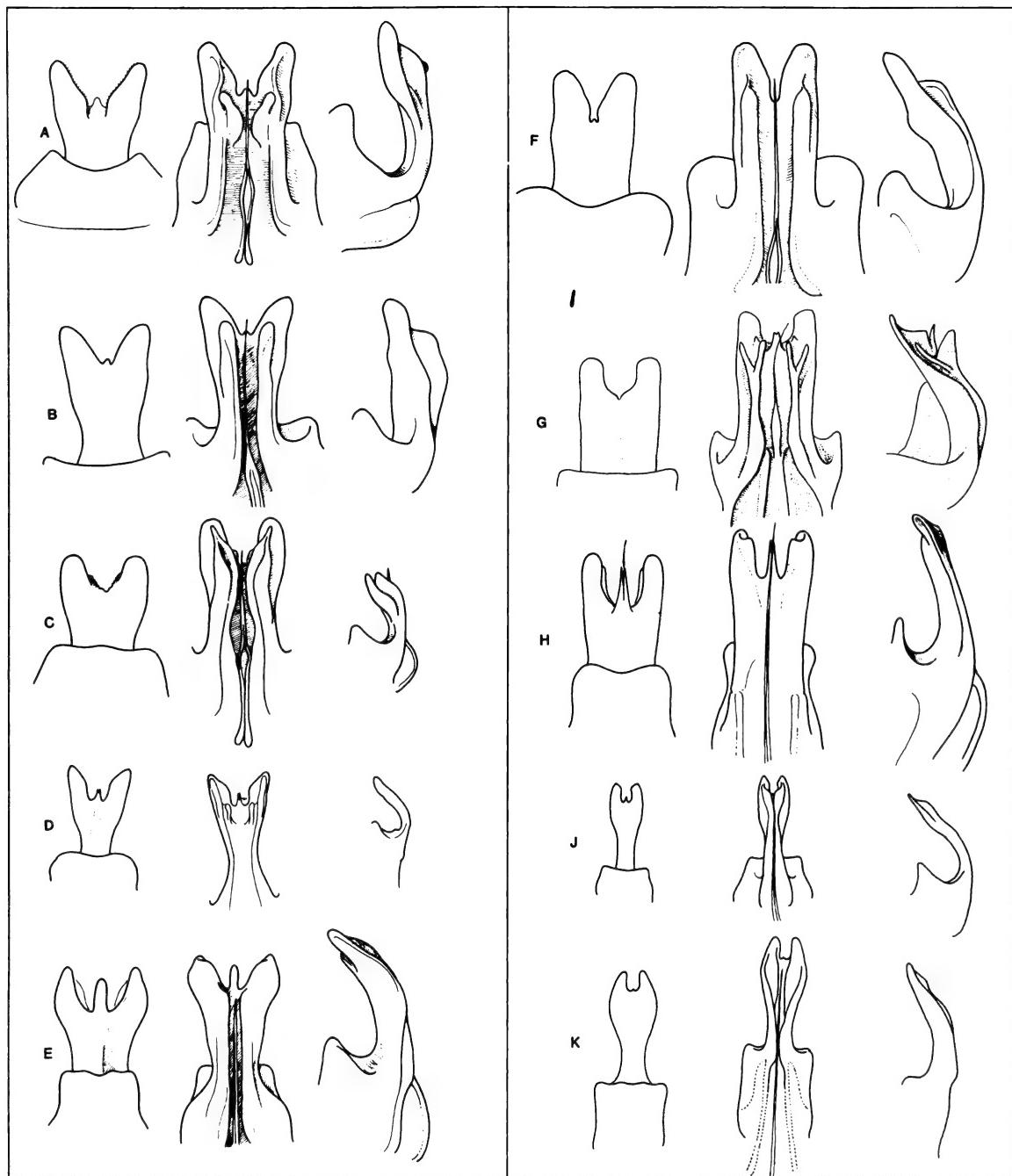


FIG. 188. *Endacusta* male genitalia. A, *australis* Ardrossan SA; B, *irrorata* Murrawijinee Cave; C, *minor* holotype; D, *tibooburra* holotype; E, *pardalis* Borroloola; F, *koonaldia* holotype; G, *wollia*, lost specimen from Wollie Caves, NSW, by C. S. Ashley 1941; H, *kirrimurra* holotype; J, *minka* holotype; K, *lilla* holotype. E, *tibooburra*, *minka* and *lilla* drawn at half the normal scale.

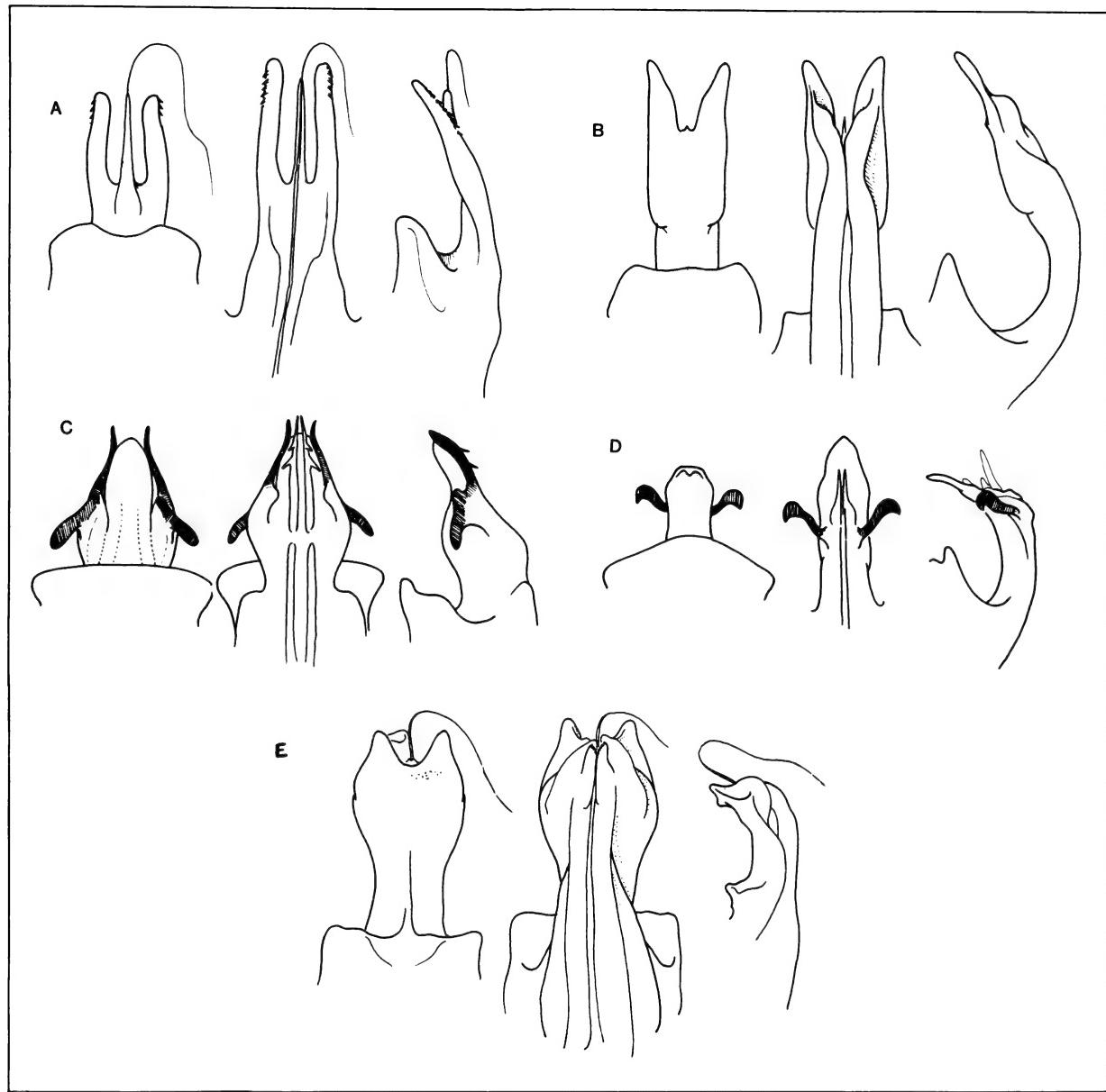


FIG. 189. A, *Endacusta yarramani* holotype; B, *Endacusta eurimbula* holotype; C, *Tathra bulburina* holotype; D, *Endotaria yelta* holotype; E, *koolpinia* Darwin NT.

as pronotum and 0.36 times as long as femur III. Femur III 1.11 times as long as tibia III. Latter 3.06 times as long as basitarsus III. Body length ca. 14 mm; femur III length ca. 11 mm; cerci ca. 8 mm.

Females: Distinguished from *E. major* by having shorter ovipositors and femur III length (Fig. 190).

HOLOTYPE. ♂, A-440, Smith's Well, 24 miles north of Broken Hill, NSW, 12 ii 1969, ANC.

SONG. Fig. 197. Train of double pulse chirps.

Chirps may be difficult to distinguish and sometimes one and 3 pulse units are produced. Sound metallic and almost nonmusical and chirp delivery rate often irregular.

	p/s	p/ch	ch/s	kps	°C
A-409	83	2	3.9	4.6	31
A-440	80-87	2-3	5.4-19.4	4.6-5.4	29
A-611	70	1-2	8.2	4.3	27

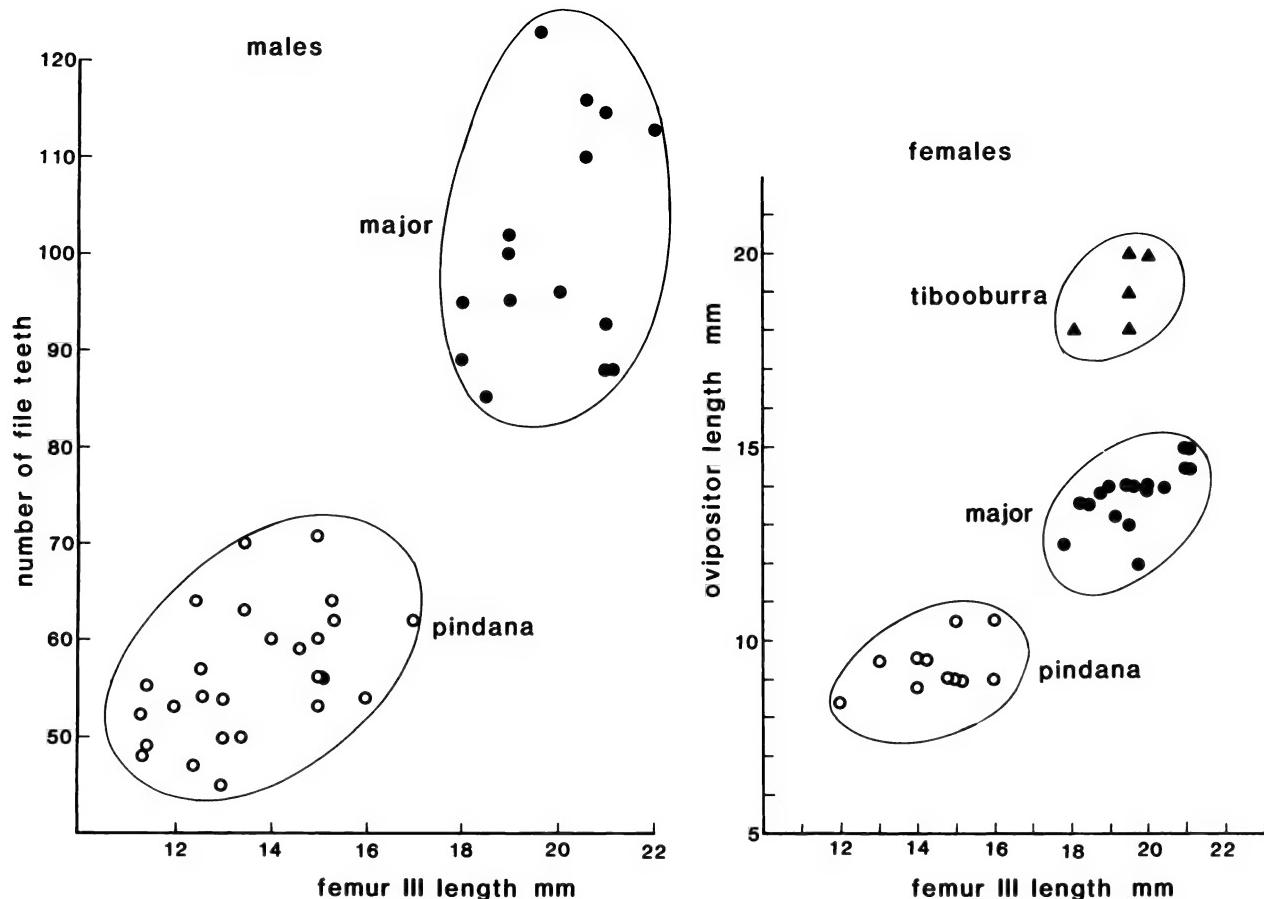


FIG. 190. *Endacusta*. Scatter diagrams comparing *pindana* and *major* males and *pindana*, *major* and *tibooburra* females.

HABITAT. Found in dense colonies, with many males singing simultaneously. Patchily distributed in rocky outcropping in dry country but may be dense in impenetrable bushes, rock piles, or old stone walls, wherever crevices are plentiful. At A-440 they sang during day in dark interior of great compact, spiny bushes, but only during darkness on stone wall of water tank, where they began to emerge from crannies at dusk.

SPECIMENS. Holotype ♂ ANC. A-409 1♂ ANC. A-421 1♂ 2j ANC. A-440 5♂ 2♀ ANC. A-450 3♂ 1j ANC. A-455 2♂ 1♀ UM. A-611 1♂ ANC. WESTERN AUSTRALIA: Parritappa, Nullarbor, 2 ii 1968 (A. M. Richards) 3♂ ANC. 28.47S 121.31E 1 km S Malcolm, 19 ii 1978 (Rentz, White) 1♂ ANC. New Woreia [or New Norcia?] 20 ii 1966 (R. Humphries) 1♂ WAM. Boondi, 21 i 1962 (A. Douglas) 1♂ WAM. Mundaring, 1 v 1963 (J. Dell) 1♀ WAM. Cavanah Range, 10-23 iii 1956 (S. Warne) 1♀ SAM. 9 mi SSE Gordon Downs HS, 13 iv 1963 (Chinnick) 1♂ ANC. 28 mi WSW Margaret River HS, 12 iv 1958 (Chinnick, Walker) 1♀ ANC. Gahnda Rockhole, 1 ii 1967 (White) 2♂ 1♀ ANC. NORTH-

ERN TERRITORY: 145 mi NW Alice Springs, Coniston, 18 ii 1966 (J. A. Grant—BM 1973-346) 5♂ 9♀ BM. Ayers Rock, 16 ii 1967 (Upton) 1♀ ANC. Areyonga, 14 ii 1958 (Woodcock) 1♀ SAM. 23.41S 134.15E 39 km E Alice Springs, 26 x 1978 (Rentz) 1♂ ANC. 24.15S 133.26E James Ranges, 22 ix 1978 (Rentz) 1♂ ANC. QUEENSLAND: 29 km N by W of Thylungra HS, 13 ii 1972 (Lewis) 1♂ ANC. 20 mi W Quilpie, 16 iii 1964 (Chinnick) 1♂ 1♀ ANC. 8 km S Wyandra, 16 ii 1972 (Lewis) 1♂ ANC. SOUTH AUSTRALIA: 35.55S 140.14E Mount Rescue Nat. Pk., 19 km NNW Keith, 12 xii 1977 (Rentz, Rentz) 1♀ ANC. Hammond (V. H. Mincham) 1♂ 1♀ AM. 16 mi E Mt. Davies, Tomkinson Ranges, 25 iii 1963 (Chinnick) 1♀ ANC. Near Frasers Hut, Correweloo Sta., iii 1950 (Gross) 1♂ SAM. NEW SOUTH WALES: 30.50S 146.33E 23 km SE by S Byrock, 5 iv 1976 (Key, Balderson et al.) 1♀ ANC.

LISTENING RECORDS. A-441, A-442, A-444, A-445, A-447, A-451, A-453, A-454, A-455.

Endacusta minor Chopard, Figs. 188C, 193P, 194V

Endacusta minor Chopard 1951: 455. Holotype ♂, Minnipa, SA (H. A. Johnson) SAM. Type examined.

RANGE. Type locality in southcentral SA.

RECOGNITION. Males: Small species. Body length ca. 12 mm to end of abdomen; femur III 9.5 mm. File with 75 teeth. FW venation as in Fig. 194V, with 4 harp veins. Genitalia as in Fig. 188C. Dorsum of head dropping very steeply (almost vertically) from vertex to lateral ocelli (Fig. 193P). FW about 1.94 times as long as pronotum. Tibia III with 4 inner and 4 outer subapical spurs.

SONG. Not known.

HABITAT. Probably caves, burrows, and rock crevices.

SPECIMENS. Holotype ♂ SAM.

***Endacusta koonaldia* n. sp., Figs. 188F, 191H, 192O, 193O, 194U**

RANGE. Extreme southwestern SA.

RECOGNITION. Males: Genitalia as in Fig. 188F. FW venation as in Fig. 194U. File with 75–83 teeth ($n=4$). Top of rostrum with prominent dark bristles. FW 1.25 times as long as wide and 1.71 times as long as pronotum. Femur III 1.0 times as long as tibia III. Tibia III with 4 inner and 4 outer subapical spurs. Body length ca. 17 mm to end of abdomen. Holotype measurements: Body length to end of abdomen 17.0 mm; FW length 5.3 mm; femur III 18 mm; cerci 13 mm.

Females: distinguishable from most other species in having ovipositor much longer than femur III. In this respect similar to *E. australis*, but differ from that species in pronotal coloration (Fig. 192O).

HOLOTYPE. ♂, Blowhole entrance, near Koonalda, SA, 7 i 1960 (P. Aitken) SAM.

SONG. Not known.

HABITAT. Taken at blowhole entrance and in wombat burrows.

SPECIMENS. Holotype ♂ SAM. SOUTH AUSTRALIA: Cave at hut at White Wells, ii 1957 (Warner) 2♀ SAM. 31.28S 130.50E 7 km WSW Nullarbor HS, 11 ii 1978 (Rentz, White) 2♂ 1♀ ANC, 1♂ ANSP. 7 mi S Koonalda, 4 iv 1973 (Aitken, Forrest) 1♂ SAM.

***Endacusta irrorata* Saussure, Figs. 188B, 192P, 193L, 194L**

Endacustes irrorata Saussure 1878: 436. Holotype ♂, Queensland, Nouv. Holl. MHD Saussure, *Endacustes irrorata* Saussure, GM. Type examined.

RANGE. South Australia.

RECOGNITION. Males: Most similar to *E. tiboo-*

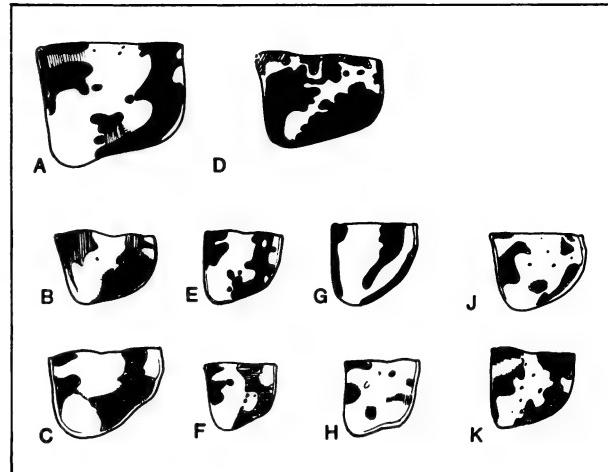


FIG. 191. *Endacusta* lateral lobes. A, *pardalis* ♀; B, *koolpinya* holotype; C, *tiboburra*; D, *minka* holotype; E, *pardalis* ♀; F, *mareeba*; G, *koolpinya* ♀ Cahills Crossing; H, *koonaldia*; J, *major*; K, *lilla* holotype.

burra, *E. pardalis*, and *E. australis* but differs in male genitalia, number of file teeth, and relatively longer ovipositor. Subgenital plate as in Fig. 193L. File 63–70 teeth ($n=3$). FW venation as in Fig. 194L. FW ca. 1.55 times as long as pronotum and 0.28 times as long as femur III. Femur III ca. 1.03 times as long as tibia III. Latter ca. 3.14 times as long as basitarsus III. Body length 14–17 mm; femur III 13–16 mm; ovipositor 9–10 mm.

SONG. Not known.

HABITAT. Known from caves.

SPECIMENS. Holotype ♂ GM. SOUTH AUSTRALIA: Murrawijinee Cave, N9, Nullarbor (A. M. Richards) 3♂ ANC. Chopard determined: Brinkworth, Oodnadatta, SAM.

***Endacusta australis* (Saussure), Figs. 188A, 192E, 193Q, 194P**

Endacustes australis Saussure 1878: 437. Holotype ♂, La Nouvelle-Hollande; Melbourne, Stuttgart Museum. Type not seen.

RANGE. Melbourne area (holotype) and from SA.

We have not studied the type which may be lost. The original description does not help in separating this species from other *Endacusta* species, for the genitalia of the type were not figured. Chopard figured the genitalia of a specimen he believed to be *australis*, but it is not known which specimen. The figure he gives is similar to that of the holotype of *E. minor*. Other specimens identified by Chopard

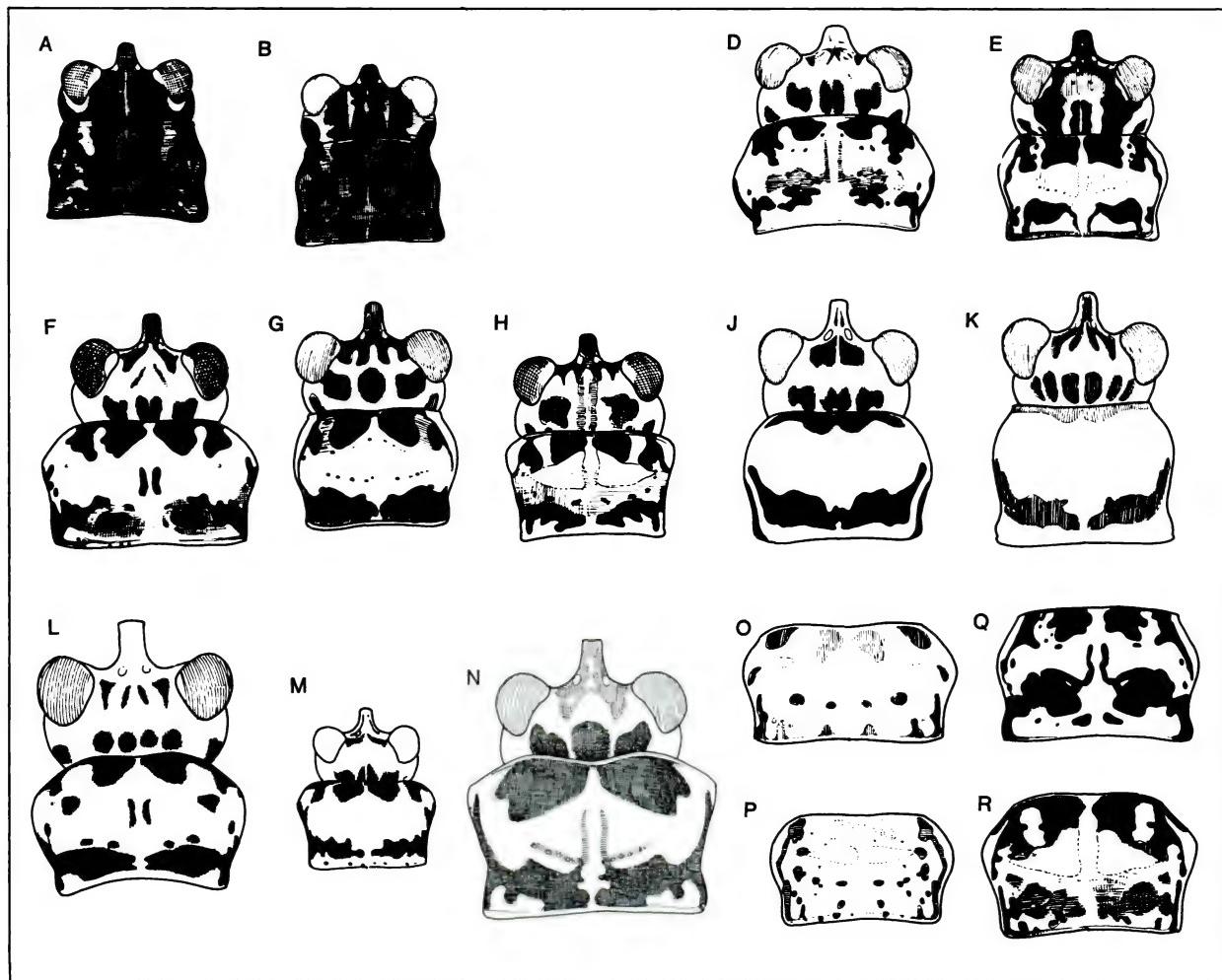


FIG. 192. *Endacusta* heads and pronotal disks. A, *mjöbergi* Stradbroke Isl.; B, *kirrimurra* holotype; C, *minka* holotype; D, *mareeba* holotype; E, *australis* Ardrossan SA; F, *pardalis* ♀; G, *pardalis* ♂ Borroloola; H, *pindana* 145 mi NW Alice Springs, J, *koolpinya* ♀ Cahills Crossing; K, *paraboora* holotype; L, *major* A-459; M, *tibooburra* paratype; N, *koolpinya* holotype; O, *koonaldia*; P, *irrorata* Murrawidjinee Cave; Q, *morillum* holotype; R, *lilla* holotype.

in the SAM have genitalia as in Fig. 188A. Saussure gives the following holotype measurements: Body length 14 mm; FW length 4.0 mm; pronotum length 2.1 mm; width of pronotum 3.7 mm; femur III length 13 mm.

RECOGNITION. Males: Most similar to *E. irrorata*. Rather small, body length ca. 16 mm to end of abdomen. Genitalia as in Fig. 188A. FW venation as in Fig. 194P. File with 99 teeth. Head profile as in Fig. 193Q. FW's 1.74 times as long as pronotum and 1.24 times as long as wide. FW length 4.5 mm; femur III 15 mm; cerci ca. 10 mm.

Females: Ovipositor much longer than femur III (unlike *E. irrorata*, *E. tibooburra*, and *E. arita*). In this respect females resemble *E. koolpinya*, but in latter cerci exceptionally long. Femur III between 1.3 and 1.5 times as long as cerci; in *E. pardalis* femur III is shorter than cerci.

SONG. Not known.

HABITAT. Crevices, cracks, caves, and rabbit burrows.

SPECIMENS. Holotype ♂ Stuttgart. SOUTH AUSTRALIA: Adelaide, xii 1955 (V. Dukk) 1♀ SAM. Burnside, 1 ii 1948, 1♀ SAM. Pt. Vincent, 1883, 2♀ SAM. Marino, 1935, 1♀ SAM. Henley

Beach, xii 1955, 1♂ SAM. Adelaide, 1♂ SAM. Semaphore, vi 1954, 1♀ SAM. Callington, 25 xi 1884 (Tepper) 1j SAM. Salisbury, iv 1903 (Lietz) 1♂ SAM. Pt. Wakefield, iv 1903, 1♀ SAM. 6 km W of Ardrossan, 7–30 iv 1978 (Cameron) 1♂ 1♀ ANC.

Endacusta tibooburra n. sp., Figs. 188D, 191C, 192M, 194H

RANGE. Type locality in northwestern NSW.

RECOGNITION. Males: Head relatively narrower than posterior end of pronotum (Fig. 192M). Genitalia as in Fig. 188D. FW venation as in Fig. 194H. Harp with 6 veins. File with 78 teeth ($n=1$). FW relatively much shorter than in *E. pindana* and *E. major*—about 1.5 times as long as pronotum. Holotype measurements: Pronotum 1.6 times as wide as long. FW 1.50 times as long as pronotum and 0.29 times as long as femur III. Femur III 1.01 times as long as tibia III. Latter 3.37 times as long as basitarsus III. Body length ca. 22 mm; femur III length ca. 18.5 mm; cerci ca. 18 mm (tip broken).

Females: Head narrow as in male. Ovipositor about as long as femur III. Cerci about as long as femur III. See Fig. 190 for comparison with *E. major*.

HOLOTYPE. ♂, Tibooburra, NSW, 16 xi 1949 (E. F. Riek) ANC.

SONG. Unknown.

HABITAT. Probably rock crevices and shallow caves.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 5♀ 1j ANC.

Endacusta pardalis (Walker), Fig. 188E, 191E, 192FG, 193F, 194Q

Zaora pardalis Walker 1869: 90. Holotype ♀, Victoria River, North Australia, BM. Transferred to *Endacusta* by Chopard 1951: 453. Type examined.

RANGE. Northern NT. Type locality in northern NT.

RECOGNITION. Males: Differing from similar species *E. australis*, *E. tibooburra*, and *E. irrorata* in male genitalia (Fig. 188E). FW venation as in Fig. 194Q. File with 81 teeth ($n=1$). Top of head sloping gradually from vertex to front of rostrum (Fig. 193R). FW 1.57 times as long as pronotum and 1.24 times as long as wide. Body length ca. 18 mm to end of abdomen; FW length 4.8 mm; femur III 15 mm; cerci ca. 16 mm.

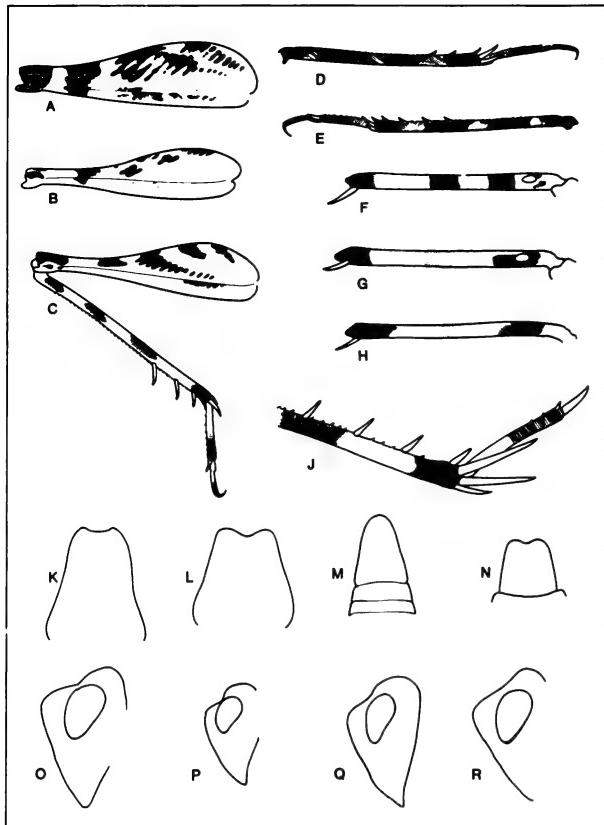


FIG. 193. A, D, E, *Endotaria taitpulluna*, remainder *Endacusta*: A, *taitpulluna* femur III outer; B, *mareeba* femur III outer; C, *major* outer; D, *Endotaria taitpulluna* inner; E, same, inner; F, *pardalis* tibia I inner; G, *koolpinya* ♀ tibia I inner; H, *paraboora* tibia I inner; J, *major* tibia III inner. K–N, male subgenital plates: K, *mareeba*; L, *irrorata*; M, *major*; N, *morrillum*. O–R, side of head: O, *koonaldia*; P, *minor*; Q, *australis*; R, *pardalis*.

Females: Femur III slightly longer than ovipositor and slightly longer than cerci.

SONG. Not known.

HABITAT. Probably rock crevices.

SPECIMENS. Holotype ♀ BM. 16.95S 136.05E, 36 miles southwest of Borroloola, NT, 4 xi 1975 (M. S. Upton) 1♂ ANC. Same data, 1♀ 2j, ANC.

Endacusta koolpinya n. sp., Figs. 187H, 189E, 191BG, 192JN, 193G, 194J

RANGE. Darwin area, NT.

RECOGNITION. Males: Genitalia as in Figs. 187H, 189E. FW venation as in Fig. 194J. Disk of pronotum patterned as in Fig. 192N. Top of head, prono-

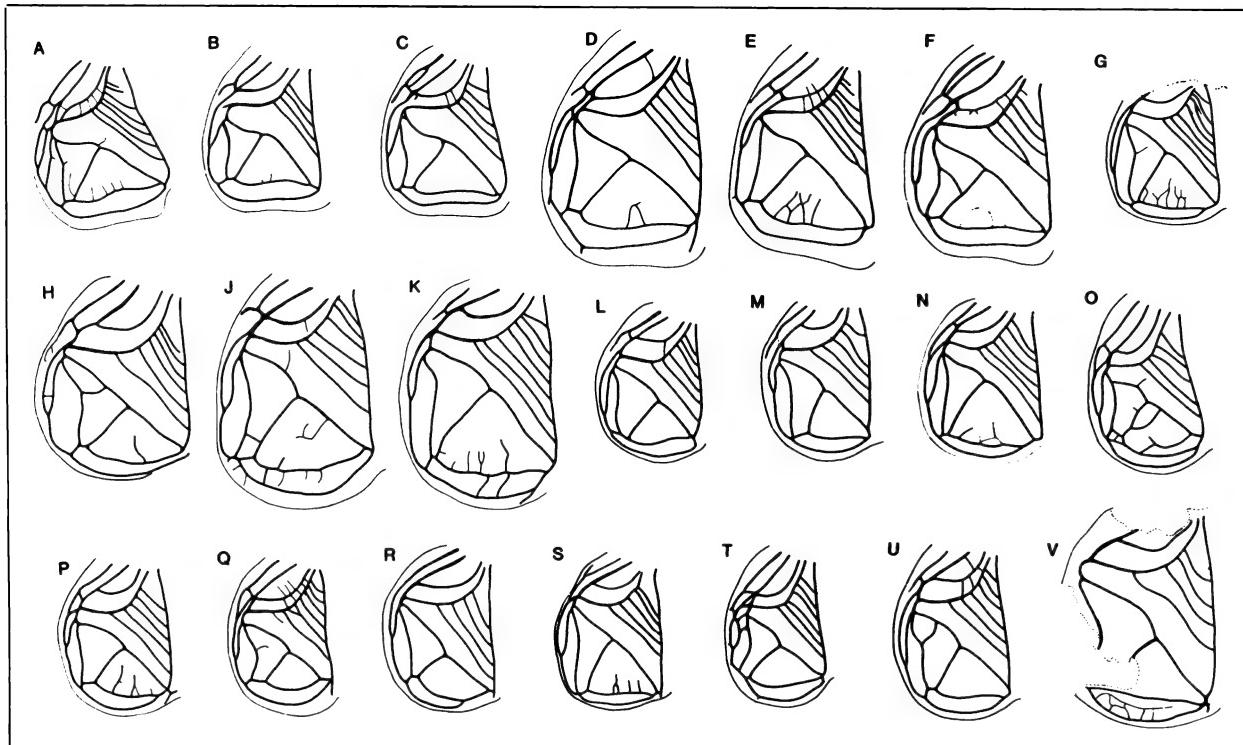


FIG. 194. *Endacusta* right FW dorsal field (not all at same scale). A, *pindana* A-421; B, *pindana* A-440; C, *pindana* A-409; D, *major* Mt. Kenneth WA; E, *major* A-459; F, *major* A-450; G, *kirrimurra*; H, *tibooburra*; J, *koolpinya*; K, *cocoparae*; L, *irrorata* Murrawidjinee Cave; M, *koonaldia* Nullarbor HS; N, *mjöbergi*; O, *morillum*; P, *australis* Ardrossan SA; Q, *pardalis* Borroloola; R, *lilla*; S, *minka* holotype; T, *mareeba* A-314; U, *koonaldia* Blow Hole; V, *minor* holotype.

tum, and abdomen covered with fine hairs. Tympanum small, greatest dimension about half width of tibia. File with 94 teeth (paratype ♂). FW ca. 1.76 times as long as pronotum. Pronotum 1.48 times as wide as long. FW 1.76 times as long as pronotum and 0.36 times as long as femur III. Femur III 1.02 times as long as tibia III. Body length ca. 21 mm (body a little shrunken); femur III ca. 19.5 mm; cerci ca. 20 mm.

Females: Ovipositor about as long as femur III (Table 16) and cerci longer than femur III. Differences from presumed relatives *E. australis*, *E. tibooburra*, *E. irrorata*, and *E. pardalis* given in Table 16. In another relative, *E. parabooora*, ovipositor short and tibia I lacks tympana. Head and pronotum as in Fig. 192J. Middle dark band on inner face of tibia I indistinct (distinct in *E. pardalis*). Femur III 0.97–1.00 times as long as ovipositor and 0.6–0.8 times as long as the cerci. Femur III length 18–19 mm.

HOLOTYPE. ♂, Koolpinya, NT, 3 vi 1912 (G. F. Hill) SAM.

SONG. Not known.

HABITAT. Not known, perhaps rock faces and crevices.

SPECIMENS. Holotype ♂ SAM. NORTHERN TERRITORY: 12.26S 132.58E 1 km S Cahills Crossing, East Alligator River, 3 xi 1972 (Key et al.) 2♀ ANC. Nourlangie Rock, 10 km E Mt. Cahill, 18 vi 1972 (Upton) 1♂ ANC. Darwin (G. F. Hill) 1♂ 1♀ SAM. 7 km NW by N of Cahills Crossing, East Alligator River, 12 xi 1972 (Upton et al.) 1♀ 3j♀ ANC.

***Endacusta parabooora* n. sp., Figs. 192K, 193H**

RANGE. Extreme northern NT.

RECOGNITION. Females: Very similar superficially to *E. boora* but with femur III more than twice as long as ovipositor and unique in lacking both outer and inner tympana. Pronotal and head patterns as in Fig. 192K. Tibia I as in Fig. 193H. Femur III 0.75 times as long as cerci and 2.25 times as long as ovipositor. Femur III 18 mm; cerci 24 mm.

HOLOTYPE. ♀, 12.26S 132.58E, 1 km S of Cahills Crossing, East Alligator River, NT, 3 xi 1972 (Key et al.) ANC.

SONG. Not known, absence of female tympana indicates male does not sing and may be entirely wingless.

HABITAT. Not known.

SPECIMENS. Holotype ♀ ANC. NORTHERN TERRITORY: 15 km E Mt. Cahill, 24 v 1973 (Key) 1♂ ANC. 7 km NW by N Cahills Crossing, East Alligator River, 9 vi 1973 (Upton, Feehan) 1♂ ANC. Nourlangie Rock, 10 km E Mt. Cahill, 18 vi 1972 (Upton) 1♂ ANC.

***Endacusta kirrimurra* n. sp., Figs. 188H, 192B, 194G**

RANGE. Southeastern coastal QLD.

RECOGNITION. Males: Very dark, pronotum with larger black areas than pale areas; lateral lobes almost entirely black except for small pale spot in lower front quarter. FW's dark brown. Cerci dark brown. Genitalia as in Fig. 188H. FW venation as in Fig. 194G. File with 95 teeth. Tibia III with 2 inner and 2 outer subapical spurs. FW 1.60 times as long as pronotum and 1.08 times as long as wide. Harp with 7 veins in upper wing, 9 veins in lower wing. Body length ca. 11 mm; femur III 13 mm; cerci ca. 12 mm.

Females: Only female believed to belong to this species has femur III 1.09 times as long as ovipositor and about 1.0 times as long as cerci. Head, pronotum, and legs not as dark as in holotype. Femur III length 12.5 mm.

HOLOTYPE. ♂, 25.10S 153.17E, 19 km SSW of Indian Head, Fraser Island, QLD, 11–14 x 1979 (Rentz, Balderson) ANC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC. QUEENSLAND: 26.00S 153.05E Camp Milo, Cooloola Nat. Park, 16–20 x 1978 (Rentz, Balderson) 1♀ ANC.

***Endacusta mareeba* n. sp., Figs. 187A, 191F, 192D, 193BK, 194T**

RANGE. Type locality in northeastern QLD.

RECOGNITION. Males: Genitalia as in Fig. 187A. Subgenital plate as in Fig. 193K. File with 64–70 teeth (n=2). Harp with 6 veins. Mirror undivided. FW venation as in Fig. 194T. Femur III patterned as in Fig. 193B. FW relatively short, about 1.66

times as long as pronotum. Holotype measurements: Pronotum 1.62 times as wide as long. FW 1.66 times as long as pronotum and 0.28 times as long as femur III. Femur III 1.07 times as long as tibia III. Latter 3.04 times as long as basitarsus III. Body length ca. 16 mm; femur III ca. 15 mm; cerci ca. 16 mm.

HOLOTYPE. ♂, A-314, just south of Mareeba, QLD, 3 ix 1968, ANC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC.

***Endacusta mjöbergi* Chopard, Figs. 187C, 192A, 194N**

Endacusta mjöbergi Chopard 1925: 28. Holotype ♂, Glen Lamington, QLD (Mjöberg) sm. Type examined.

RANGE. Extreme southeastern QLD.

RECOGNITION. Males: Very dark (Fig. 192A) as in *E. kirrimurra*. Differs from similar *E. kirrimurra* and *E. mareeba* principally in genitalic configuration and number of file teeth (Fig. 187C; Table 16). Head, pronotum, and abdomen mostly dark brown to black. Dark bands on legs broader than pale bands. FW venation as in Fig. 194N. Harp with 6–7 veins. File of male from Stradbroke Island with ca. 80 teeth. Antennae mostly dark but with periodic small yellow rings. FW ca. 2.0 times as long as tibia III. Latter is 3.76 times as long as basitarsus III. Body length of male 12–13 mm; femur III ca. 12 mm.

SONG. Not known.

HABITAT. Probably forests.

SPECIMENS. Holotype ♂ sm. Stradbroke Island, QLD, 3 xii 1972 (H. Hacker) 1♂ pm.

***Endacusta yarramani* n. sp., Fig. 189A**

RANGE. Southeastern QLD, vicinity of Yarraman, Cooyer, and Maidenwell.

RECOGNITION. Males: Antennae mostly black but with periodic yellow rings. Genitalia similar to *E. mjöbergi*, but epiphalllic processes narrower (Fig. 189A). Pronotum not as black as in *E. mjöbergi*. FW venation similar to *E. mjöbergi*. Mirror partly or wholly divided into small cells along posterior part. Harp with 7–8 veins. File with 84–94 teeth (n=5); holotype with 94 teeth. Body length 11–12 mm; femur III length ca. 10 mm; cercal length 10–12 mm.

Females: Ovipositor about as long as femur III.

HOLOTYPE. ♂, Rainforest Pitfall 17A, 3 km east of Yarraman, SE QLD, 1974–1975, 518 m (G. B. and S. R. Monteith) QM.

HABITAT. All specimens collected by Monteiths in rainforest pitfall traps.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 3♂ 10♀ QM. Rainforest Pitfall 50, Cooyar-Maidenwell Rd, SE QLD, 1975–1976, 640 m (Monteith) 1♂ 2♀ QM.

Endacusta cocaparae n. sp., Figs. 187D, 194K

RANGE. Type locality in southcentral NSW.

RECOGNITION. Males: Most similar to *E. morillum* but having fewer file teeth (holotype has 55) and having quite different genitalia (Fig. 187D). Hind femora exceptionally long (22 mm vs 14.7 for *E. morillum*). FW venation as in Fig. 194K. FW 2.06 times as long as pronotum. Legs I and II very long—femur III 6.3 times as long as pronotum. Femur I 3.12 times as long as pronotum.

HOLOTYPE. ♂, Cocapara National Park, near Griffith, NSW, 1 x 1978 (J. M. Walker) ANC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC.

Endacusta morillum n. sp., Figs. 187B, 192Q, 193N, 194O

RANGE. Type locality in mountains of northeastern QLD.

RECOGNITION. Males: Differing from *E. cocaparae* in genitalia (Fig. 187B). FW length, and number of file teeth. Subgenital plate as in Fig. 193N. File with 79 teeth ($n=1$). FW relatively short, 1.55 times as long as pronotum. FW's mostly dark, posterior margin pale. Cerci mostly brown but yellowish at base. Pronotum 1.55 times as wide as long. FW 1.55 times as long as pronotum and 0.30 times as long as femur III. Femur III 1.04 times as long as tibia III. Latter 4.81 times as long as basitarsus III. Body length ca. 17 mm; femur III length ca. 14.5 mm; cerci ca. more than 13 mm (tip broken).

HOLOTYPE. ♂, 10 miles north of Mt. Carbine, QLD, 31 vii 1967 (F. J. Gay) ANC.

SONG. Not known.

HABITAT. Probably rock crevices.

SPECIMENS. Holotype ♂ ANC.

Endacusta lilla n. sp., Figs. 188K, 191K, 192R, 194R

RANGE. Type locality in central coastal QLD.

RECOGNITION. Males: Genitalia as in Fig. 188K. FW venation as in Fig. 194R. File with 105 teeth ($n=1$). Harp with 4 veins. Cerci mostly brown, but with small pale area at base. Pronotum 1.57 times as wide as long. FW 1.43 times as long as pronotum and 0.25 times as long as femur III. Femur III 0.96 times as long as tibia III. Latter 3.96 times as long as basitarsus III. Body length ca. 17 mm; femur III length 18 mm; cerci ca. 20 mm.

HOLOTYPE. ♂, Mackay, QLD, 13 xii 1948 (R. J. McNamara) UQC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ UQC.

Endacusta minka n. sp., Figs. 188J, 191D, 192C, 194S

RANGE. Type locality in Biggenden, QLD.

RECOGNITION. Males: Very similar to *E. eurimbula*. File with 57 teeth. FW venation as in Fig. 194S. Dorsum of head and pronotum as in Fig. 192C. Male genitalia (Fig. 188J) most similar to *E. lilla*. Femur I ca. 2.1 times as long as pronotum. FW ca. 1.8 times as long as pronotum. Body length 13 mm; femur III length 11.7 mm; FW length 4.3 mm; cercal length ca. 13 mm.

HOLOTYPE. ♂, Biggenden, QLD, 9 x 1971 (H. Frauca) ANC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC.

Endacusta eurimbula n. sp., Fig. 189B

RANGE. Coastal QLD north of Bundaberg.

RECOGNITION. Males: Most similar to *E. minka* and *E. lilla* but differing slightly in shape of epiphallus (Fig. 189B). Harp with 6 veins. Mirror undivided. Dorsum of head striped as in *E. minka*. File with 60–75 teeth ($n=3$); holotype with 60 teeth. FW about twice as long as pronotum. Body length ca. 13 mm; femur III length 11–12 mm.

Females: Ovipositor, femur III, and cerci nearly equal in length. Body length 13–17 mm; femur III length 12–13 mm.

HOLOTYPE. ♂, Rainforest Pitfall 47A, Eurimbula

Creek, via Round Hill Heard, QLD, 1975–1976, 10 m (G. B. and S. R. Monteith) QM.

SONG. Not known.

HABITAT. All specimens collected by the Monteiths in pitfall traps.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 2♂ 13♀ QM. Rainforest Pitfall 48, Deepwater Creek, via Rosedale, QLD, 1975–1976, 10 m (Monteith) 1♂ 1j QM.

Endacusta wollia n. sp., Fig. 188G

This species is described from a specimen from Woll Caves, NSW, collected by C. S. Ashley in 1941 and believed to be from the ANC collection. It was dissected and its genitalia figured; but the specimen has been lost (Fig. 188G).

Endacusta cycloptera Chopard, Fig. 187G

Endacusta cycloptera Chopard 1951: 458. Holotype ♂, Nepean River, NSW, 6 iii 1920 (A. Musgrave) AM. Type examined.

RANGE. Known only from a male and a female from the type locality.

RECOGNITION. We have tried to borrow this specimen from the Australian Museum in Sydney without success. The genitalia of the holotype were figured in a visit to that museum and they are distinct from those of other species (Fig. 187G). Chopard furnishes the following description (given here in part): “[disk of pronotum] uniformly rufous brown . . . Abdomen rufo-testaceous, a little mottled with brown; third tergite with posterior margin rather strongly notched in the middle; . . . subgenital plate long, strongly narrowing towards the apex which is roundly notched . . . Legs rather short, very feebly, annulated with brown . . . [front] tarsi as long as the tibiae . . . [hind] tibiae armed with 5 external, 4 internal subapical spines . . . [FW's] extending no farther than the apex of the third abdominal tergite, finely pubescent, with internal and apical margins rounded; mirror small, strongly transverse with convex posterior margin; . . . 2 or 3 [harp] veins. Length of body 14 mm; pronotal [length] 2.5 mm; posterior femur [length] 11 mm; [FW length] 3.9 mm.”

TATHRA n. gen.

TYPE SPECIES. *Tathra tatiara* n. sp.

This genus includes most of the rainforest members of the Australian Phalangopsinae. The genus

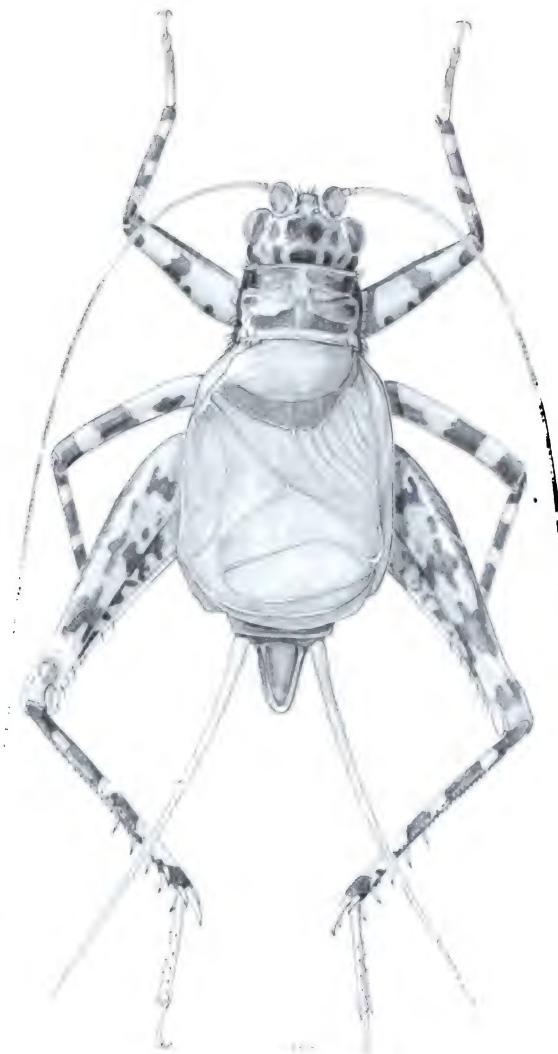
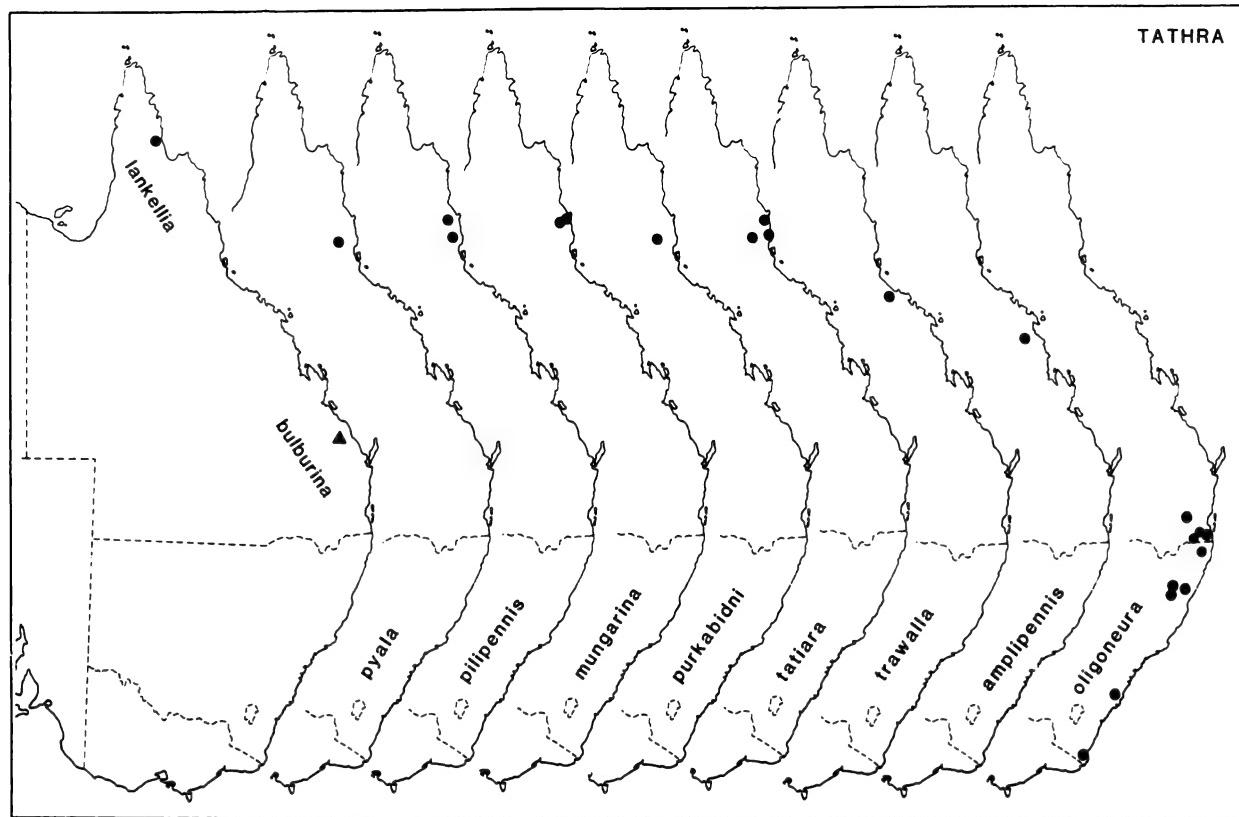


FIG. 195. *Tathra bulburina*.

includes ten species, all from wet forest of the great dividing range.

RECOGNITION. Fig. 195. Body length 9–15 mm. Males with FW but without HW; females without either. Body color dark and speckled with dark brown. Forewing usually extending to near end of abdomen and usually more than 3 times as long as pronotum (except *T. pilipennis*). Frontal rostrum relatively wider than in *Endacusta* species, with lateral ocelli separated by at least twice their diameter. Mirror usually divided by 1 to 4 veins (except *T. pilipennis* and *T. oligoneura*). File usually with over

FIG. 196. *Tathra* distributions.

150 teeth. Genitalia usually with black processes. Tibia I with small tympanum on inner face. Tibia III with 2–3 inner and 4 outer subapical spurs as well as 3 inner and 3 outer apical spurs. Longest inner apical spur about $\frac{1}{3}$ to $\frac{1}{2}$ as long as basal tarsal segment.

Tatiara Group

1. FW more than twice as long as pronotum.
2. Harp with at least 6 veins.
3. Mirror well-developed (Fig. 199A–H).
4. Mirror completely divided by at least one vein (usually 2 or more).

Oligoneura Group

1. FW more than twice as long as pronotum.
2. Harp with 3 or 4 veins.
3. Mirror well-developed (Fig. 199KL).
4. Mirror subdivided or partially subdivided into small irregular cells along posterior margin.

Pilipennis Group

1. FW less than 1.5 times as long as pronotum.
2. Harp with 6 or more veins.
3. Mirror poorly developed (Fig. 199M).
4. Mirror not divided.

TATIARA GROUP

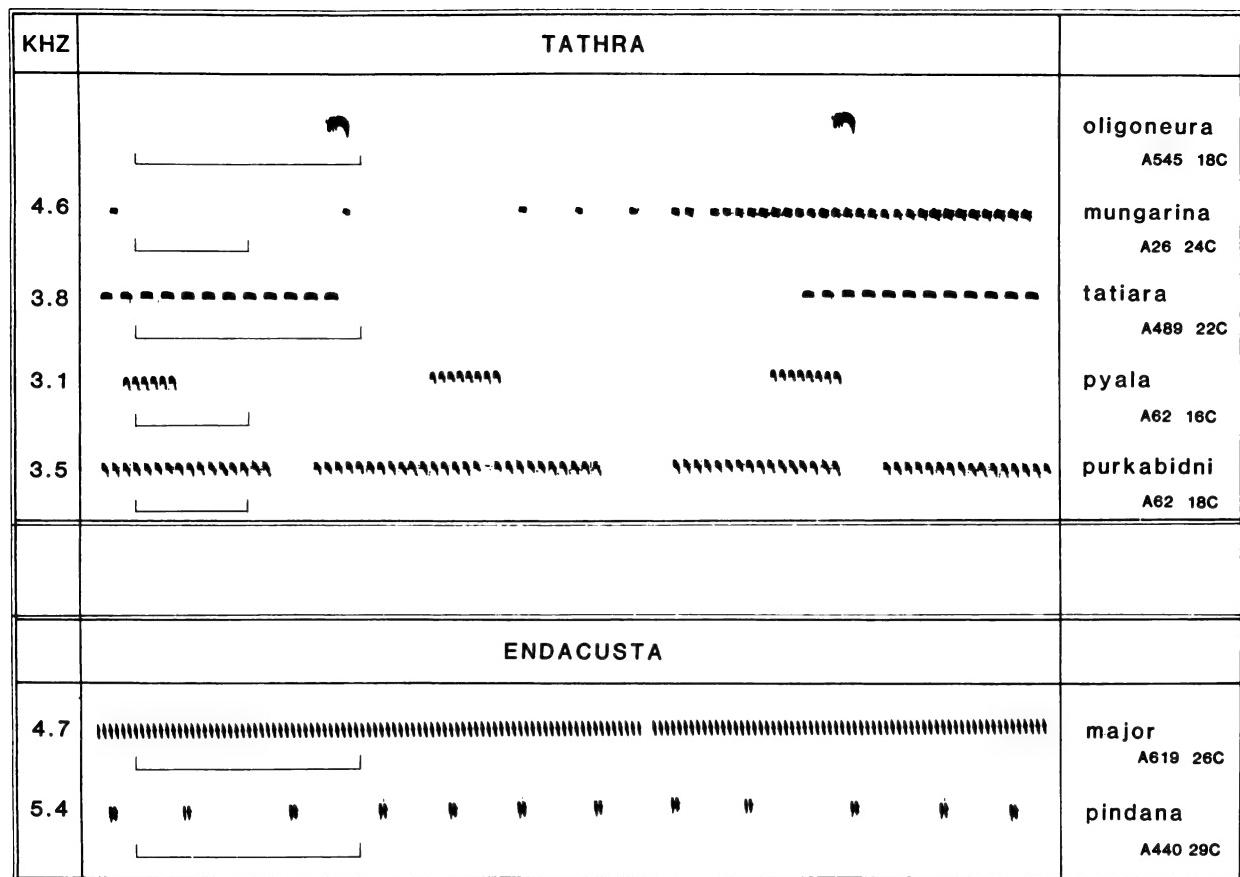
Tathra tatiara n. sp., Figs. 198FP, 199BC

RANGE. Atherton region of QLD.

RECOGNITION. Males: See generic recognition. Genitalia as in Fig. 198F. Subgenital plate as in Fig. 198P. File with 291–310 teeth ($n=3$). FW venation as in Fig. 199BC. Harp with 9 veins, and mirror divided by 3 veins. Holotype measurements: File with 310 teeth. Head 0.85 times as wide as pronotum. Pronotum 1.65 times as wide as long. FW 3.3 times as long as pronotum and 0.68 times as long as femur III. Femur III 1.11 times as long as tibia III. Latter 3.48 times as long as basitarsus III. Body length ca. 12 mm. Femur III length ca. 9 mm; cerci ca. 7 mm (tip broken).

HOLOTYPE. ♂, A-62, Lawyer Creek Road, east of Ravenshoe, QLD, 4 ix 1968, ANC.

SONG. Fig. 197. Succession of chirps roughly once every 2 seconds.

FIG. 197. *Tathra* and *Endacusta* songs. Scale = 0.5 s.

	p/s	p/ch	ch/s	kps	°C
A-62	13.3	9-11	ca. 0.5	2.8-2.9	16
A-489	22	12	—	3.8	22

HABITAT. Found at bases of tree trunks in rain forest at night.

SPECIMENS. Holotype ♂ ANC. A-24 1♂ ANC, 1♀ ANSP. A-62 2♂ 4j♀ ANC.

Tathra purkabidni n. sp., Figs. 198BM, 199D

RANGE. Type locality in Atherton region, QLD.

RECOGNITION. Males: Genitalia as in Fig. 198B. Vertex of head entirely pale, from eye to eye. Subgenital plate as in Fig. 198M. File with 261 teeth ($n=1$). FW venation as in Fig. 199D. Harp with 8 veins. Mirror divided by 2 veins. FW 3.50 times as long as pronotum and 0.70 times as long as femur

III. Femur III 1.15 times as long as tibia III. Latter 3.55 times as long as basitarsus III. Body length ca. 11 mm; femur III ca. 8 mm; cerci ca. 11 mm.

Females: Similar to male in size. Ovipositor 2.9 times as long as pronotum.

HOLOTYPE. ♂, A-62, Lawyer Creek Road, east of Ravenshoe, QLD, 6 ix 1968, ANC.

SONG. Fig. 197. Series of 6 or 8 short trills across 10 seconds or so, with momentary breaks between them and usually with one longer trill of 2 or 3 seconds duration near end of series.

	p/s	kps	°C
A-62	20.4-22.6	3.45	18

HABITAT. Found on tree trunks close to ground in rain forest.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♀ ANC.

TABLE 17. Comparison of *Tathra* species.

Species	Number file teeth	Number mirror dividing veins	End of male subgenital plate	Ovipositor length / pronotal length
<i>tatiara</i>	291–310 n=3	2 or 3	bluntly pointed	—
<i>purkabidni</i>	261 n=1	2	pointed	2.9
<i>mungarina</i>	336–368 n=4	3 or 4	pointed	—
<i>trawalla</i>	279 n=1	3	concave	3.6
<i>lankellia</i>	164 n=1	3 complete, 2 incomplete	straight	—
<i>pyala</i>	105 n=1	2	concave	3.1
<i>amplipennis</i>	228 n=1	1	slightly pointed	—
<i>oligoneura</i>	216–340 n=11	divided into small cells	indented	4.17–4.82
<i>pilipennis</i>	94 n=2	0	v-shape indented	ca. 6.0
<i>bulburina</i>	299 n=1	1	straight to broadly rounded	ca. 3.0

***Tathra mungarina* n. sp., Figs. 198CN, 199A**

RANGE. Vicinity of Innisfail, QLD.

RECOGNITION. Males: Genitalia as in Fig. 198C. Subgenital plate as in Fig. 198N. File with 336–368 teeth (n=4). FW venation as in Fig. 199A. Harp with 8–9 veins. Mirror with 3 or 4 dividing veins. Holotype measurements: Head 0.90 times as wide as pronotum. Pronotum 1.93 times as wide as long. FW 4.2 times as long as pronotum, and 0.83 times as long as femur III. Femur III 1.15 times as long as tibia III. Latter 3.14 times as long as basitarsus III. Body length ca. 10 mm; femur III length ca. 7 mm; cerci ca. 10 mm.

HOLOTYPE. ♂, A-26, rain forest along road to Bramston Beach near Innisfail, QLD, 28 x 1968, ANC.

SONG. Fig. 197. Complex trill lasting 2–6 s every 15 s or so. Initial 2–9 pulses delivered at accelerating pulse rate beginning sometimes as low as 1 pulse/s and building up to 2 or 3/s. Second part of trill is one-second uniform trill containing 15–25 pulses at pulse rate of ca. 18–23 p/s.

	p/s (2nd part)	kps	°C
A-27	21–22.4	4.9	22
A-26	18.1	4.4–4.6	24

HABITAT. Found at bases of tree trunks and on logs in rain forests.

SPECIMENS. Holotype ♂ ANC. A-26 1♂ ANC. A-27 2♂ ANSP.

***Tathra trawalla* n. sp., Figs. 198ES, 199G**

RANGE. Type locality in vicinity of Townsville, QLD.

RECOGNITION. Males: Front half of pronotal disk dark brown. Genitalia as in Fig. 198E. Subgenital plate as in Fig. 198S. File with 279 teeth. Harp with 8 veins. Mirror with 3 dividing veins. Holotype measurements: Pronotum 1.62 times as wide as long. FW 3.19 times as long as pronotum. Body length ca. 11.5 mm.

Females: Pronotal disk as in male. Ovipositor 3.59 times as long as pronotum and 0.81 times as long as femur III. Body length ca. 11 mm; femur III length ca. 9 mm.

HOLOTYPE. ♂, St. Margaret's Creek, 2–3000 ft, Mount Elliot via Townsville, QLD, 9 vi 1972 (G. B. and S. R. Monteith) UQC.

SONG. Not known.

HABITAT. Rain forests.

SPECIMENS. Holotype ♂ UQC. Same data as holotype, 1♀ UQC.

***Tathra lankellia* n. sp., Figs. 198DL, 199F**

RANGE. Type locality in Coen district, Cape York, QLD.

RECOGNITION. Males: Genitalia as in Fig. 198D. Subgenital plate as in Fig. 198L. File with 164 teeth (n=1). Harp with 8½ veins. Mirror with 4 dividing veins. With 3 veins connecting chord Cu₂ to mirror. Pronotum 1.65 times as wide as long. FW 3.55 times as long as pronotum. Body length ca. 11 mm; femur III ca. 9 mm.

HOLOTYPE. ♂, Upper Lankelly Creek, Coen District, QLD, 10–11 vi 1971 (G. B. Monteith) UQC.

SONG. Not known.

HABITAT. Rain forests.

SPECIMENS. Holotype ♂ UQC.

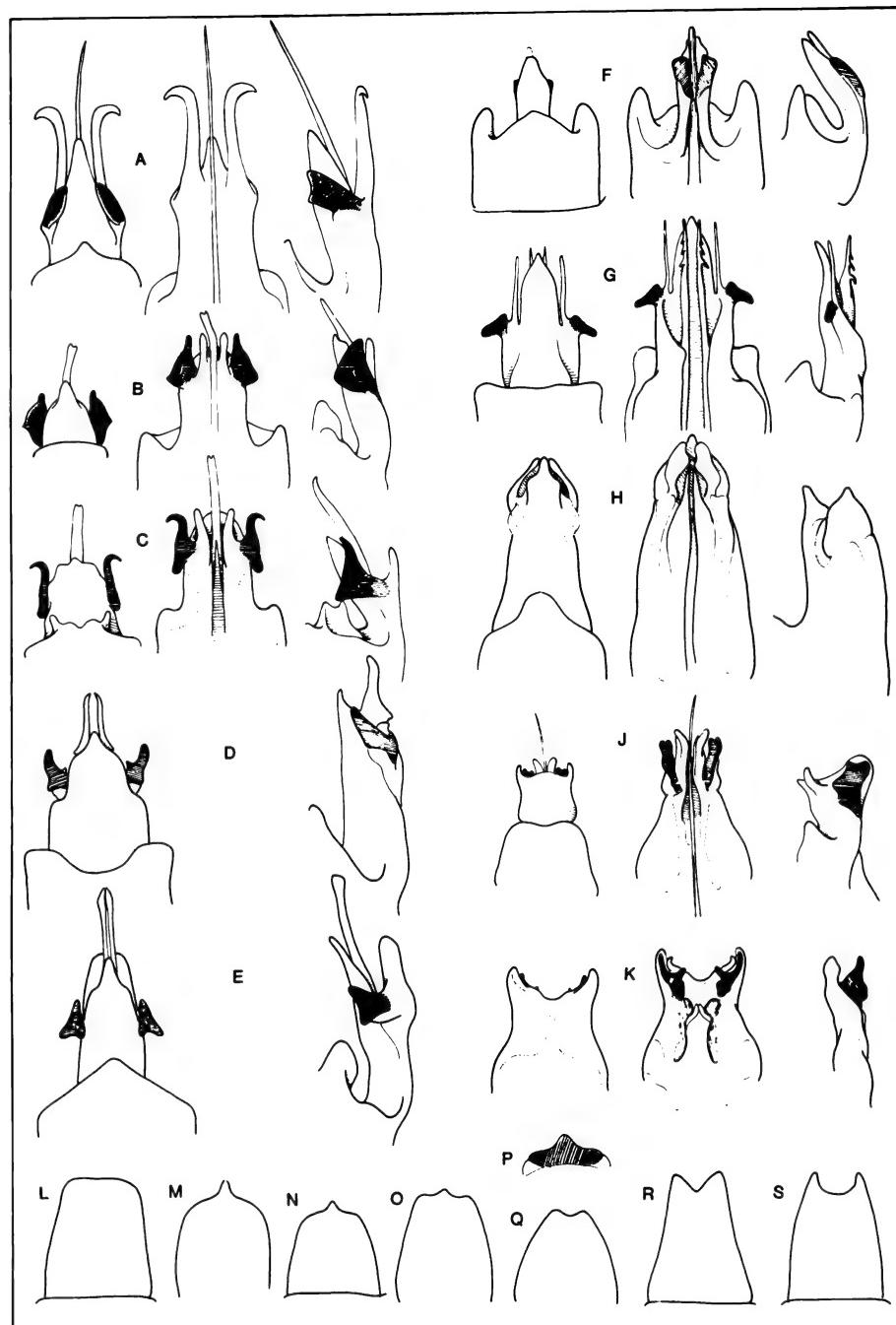


FIG. 198. *Tathra* male genitalia (dorsal, ventral, lateral views left to right). A, *pyala*; B, *purkabidni*; C, *mungarina*; D, *lankellia*; E, *trawalla*; F, *tatiara*; G, *amplipennis* Eungella; H, *oligoneura*; J, *pilipennis*; K, *angulifrons*. L-S male subgenital plates: L, *lankellia*; M, *purkabidni*; N, *mungarina*; O, *amplipennis* Eungella; P, *tatiara*; Q, *pyala*; R, *pilipennis*; S, *trawalla*.

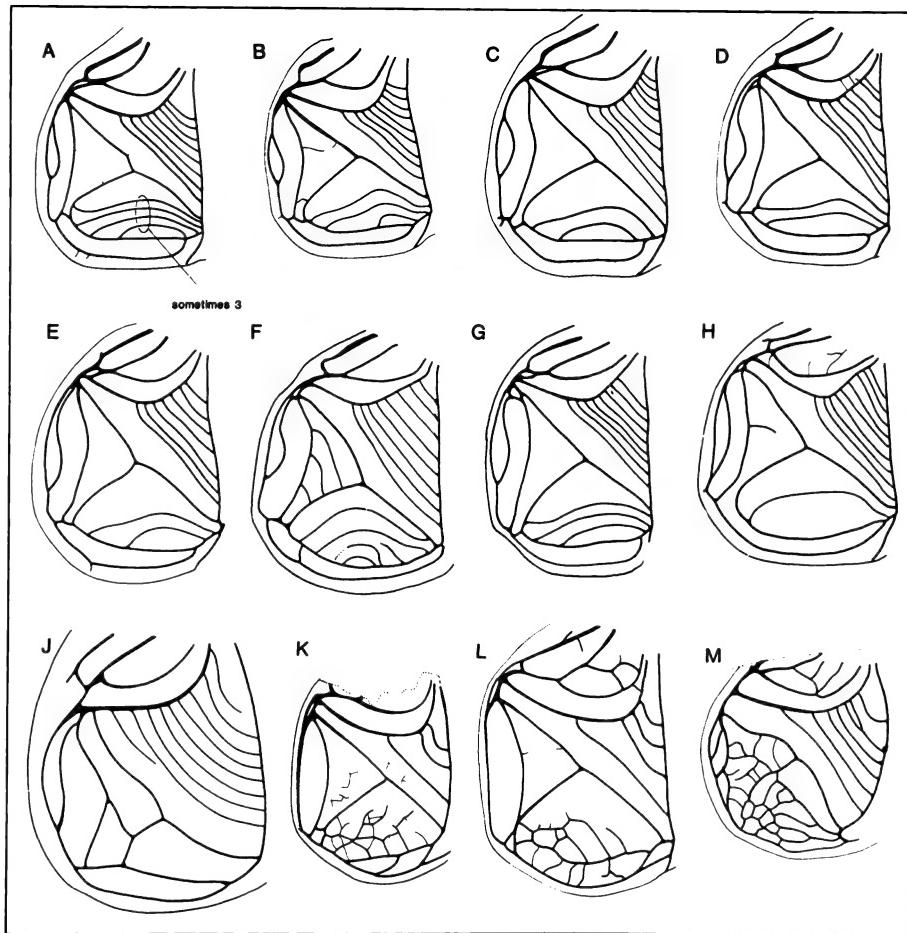


FIG. 199. *Tathra* male right FW. A, *mungarina*; B, *tatiara* A-24; C, *tatiara* holotype; D, *purkabidni* A-62; E, *pyala* A-62; F, *lankellia* holotype; G, *trawalla* holotype; H, *amplipennis* Eungella Nat. Pk.; J, *pilipennis* paratype; K, *oligoneura* holotype; L, *oligoneura* A-539; M, *angulifrons* holotype.

Tathra pyala n. sp., Figs. 198AQ, 199E

RANGE. Type locality in Atherton region, QLD.

RECOGNITION. Males: Genitalia as in Fig. 198A. Subgenital plate as in Fig. 198Q. File with ca. 105 teeth ($n=1$). FW venation as in Fig. 199E. Harp in the only existing specimen with 7 veins, and mirror with 2 dividing veins. Face without vertical median pale band as in *T. mungarina* and *T. tatiara*. FW 4.0 times as long as pronotum and 0.81 times as long as femur III. Femur III 1.20 times as long as tibia III. Latter 3.3 times as long as basitarsus III. Body length ca. 12 mm; femur III length ca. 7.2 mm; cerci ca. 8 mm.

Females: Ovipositor ca. 3.1 times as long as pronotum.

HOLOTYPE. ♂, A-62, Lawyer Creek Road, east of Ravenshoe, QLD, 6 ix 1968, ANC.

SONG. Fig. 197. Succession of chirps at roughly 7–8/10 s.

	p/s	ch/s	p/ch	kps	°C
A-62	23.7	0.7–0.8	6–8	3.1	16

HABITAT. Found around tree stumps in rain forest.

SPECIMENS. Holotype ♂ ANC. A-62 1♀ ANC.

Tathra amplipennis (Chopard), Figs. 198GO, 199H

Parendacusta amplipennis Chopard 1925: 30. Holotype ♂, Cedar Creek, QLD (Mjöberg) SM. Transferred to *Endacusta*, Chopard 1951: 460. Type examined.

RANGE. Eungella National Park, QLD.

RECOGNITION. Males: Male genitalia as Fig. 198G. FW with 9–10 harp veins. Mirror with one dividing vein. Subgenital plate as in Fig. 198O. File of holotype with 228 teeth. Tibia III with 3 inner and 5 outer subapical spurs. Body length to end of abdomen ca. 10 mm; FW length ca. 6 mm; femur III length ca. 8 mm. Tips of cerci broken.

SONG. Not known.

HABITAT. Probably around fallen tree trunks and at base of large trees.

SPECIMENS. Holotype ♂ SM. 21.09S 148.31E, ca. 3 km SE of Dalrymple Heights, Eungella National Park, QLD, 18 x 1973 (Key) 2♂ ANC.

Tathra bulburina n. sp., Figs. 189C, 195**RANGE.** Bulburin Plateau, southeast QLD.

RECOGNITION. Males: Similar to *E. amplipennis*. Mirror well developed; with one dividing vein. Harp with 7–8 veins. File of holotype with 299 teeth. Body length ca. 10 mm; femur III length ca. 8 mm; cercal length ca. 8 mm.

Females: Ovipositor about 0.7 times as long as femur III and about 3 times as long as pronotum. Body length 9–10.5 mm; femur III length 8.0–8.5 mm; cercal length 8–10 mm.

HOLOTYPE. ♂, Rainforest Pitfall 33B, Bulburin Plateau, via Miriamvale, SE QLD, 1974–1975, 10 m (G. B. and S. R. Monteith) QM.

SONG. Not known.

HABITAT. Monteiths captured all specimens in pitfall traps in rain forest.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 1♂ 1♀ 4j QM.

OLIGONEURA GROUP**Tathra oligoneura** (Chopard), Figs. 198H, 199K

Endacusta oligoneura Chopard 1951: 459. Holotype ♂, Dorrigo, New South Wales (W. Heron) SAM. Type examined.

RANGE. Coastal forests of eastern NSW and southeastern QLD.

RECOGNITION. Males: Male genitalia as in Fig. 198H. Number of file teeth varied as follows: A-560 (216–240 teeth, n=5); A-539 (321, 328); A-354 (283); A-556 (277); Dorrigo National Park, NSW (225); Mt. Glorious, QLD (318). FW venation as in Fig. 199K. Harp with 2 or 4 veins. Mirror usually with irregular network of veins at posterior end.

Body length 11.5–13 mm; femur III length 9–10.5 mm.

Females: Ovipositor 4.82 (A-539), 4.67 (A-354), 4.17 (Mt. Glorious) times as long as pronotum. Body length 11–12 mm; femur III length ca. 10 mm; ovipositor ca. 9 mm; cercal length ca. 10 mm.

SONG. Fig. 197. Succession of high-pitched single pulses at roughly 1/s.

HABITAT. Wet forests.

SPECIMENS. A-354 2♂ 4♀ ANC. A-539 2♂ 1♀ ANSP. A-556 1♂ UM. A-560 5♂ 2♀ ANC. Minnamurra Falls, near Kiama, NSW, 26 ii 1969 (Britton et al.) 1♂ ANC. Dorrigo National Park, ca. 5 mi SSE Dorrigo, NSW, 4 i 1971 (Key) 1♂ ANC. Mt. Glorious, near Brisbane, QLD, 8 iv 1978 (Rentz) 2♂ 1♀ ANC. Rainforest Pitfall 21, Plateau S of "The Head," via Killarney, SE QLD, 1974–1975, 1066 m (Monteith) 1♂ 2♀ QM. Rainforest Pitfall 35, Repeater Station, Springbrook, SE QLD, 1974–1975, 1000 m (Monteith) 1♂ 2♀ QM. *Questionable determination:* Rainforest Pitfall 40, Rotary Park, Lismore, NSW, 1974–1975, 85 m (Monteith) 6♀ QM.

PILIPENNIS GROUP**Tathra pilipemis** (Chopard), Figs. 198JR, 199J

Endacusta pilipennis Chopard 1925: 28. Holotype ♂, Malanda, QLD (Mjöberg) SM. Type examined.

RANGE. Coastal forest of northern QLD.

RECOGNITION. Males: FW's much shorter than in other *Tathra* species—about 1.2 times as long as pronotum. File with 94 teeth (n=2). Genitalia as in Fig. 198J. Subgenital plate as in Fig. 198R. FW venation as in Fig. 199J. Harp with 9 veins. Mirror poorly developed and without dividing veins. Body length 12–14 mm; femur III ca. 10 mm; cerci ca. 10 mm.

Females: Ovipositor ca. 6 times as long as pronotum at center and ca. 1.25 times as long as femur III. Body length 12–14 mm; femur III length 10–10.5 mm.

SONG. Not known.

HABITAT. Probably wet forest.

SPECIMENS. Holotype ♂ SM. Same data as holotype, 1♂ 1♀ SM. Tully Falls, QLD, 10 v 1961 (Gressitt) 1♂ 2♀ BISH.

Genus ENDOTARIA Chopard

Endotaria Chopard 1951: 460. Type species: *Endotaria aptera* Chopard, by original designation.

This genus is obviously closely related to the genus *Tathra*, sharing with that genus coloration pat-

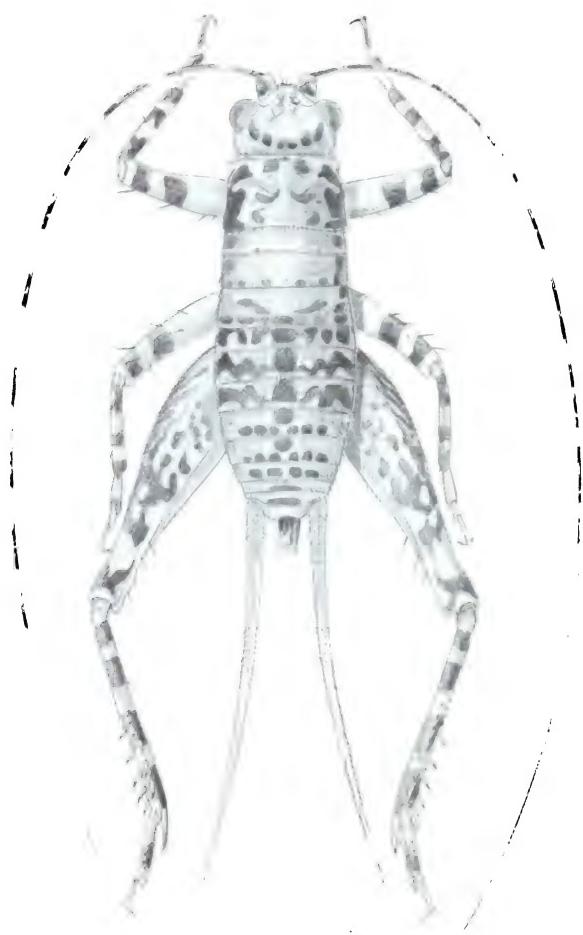


FIG. 200. *Endotaria yelta* male.

terns and general genitalic configuration and lacking only the wings and (in one species) the auditory tympana. Because the species are silent we undoubtedly missed collecting more specimens and perhaps other species. Like *Tathra* the genus is evidently a wet-forest group.

RECOGNITION. Fig. 200. Both sexes entirely wingless. Body strongly spotted with dark brown to black markings. Legs strongly banded. Auditory tympana present (*E. aptera*) or absent (*E. taitpulluna*). Hind tibiae with 3 inner and 4 outer subapical spurs.

Endotaria aptera Chopard, Fig. 202A

Endotaria aptera Chopard 1951: 461. Holotype ♂. Upper Williams River, NSW, x 1926 (Lea, Wilson) SAM. Type examined.

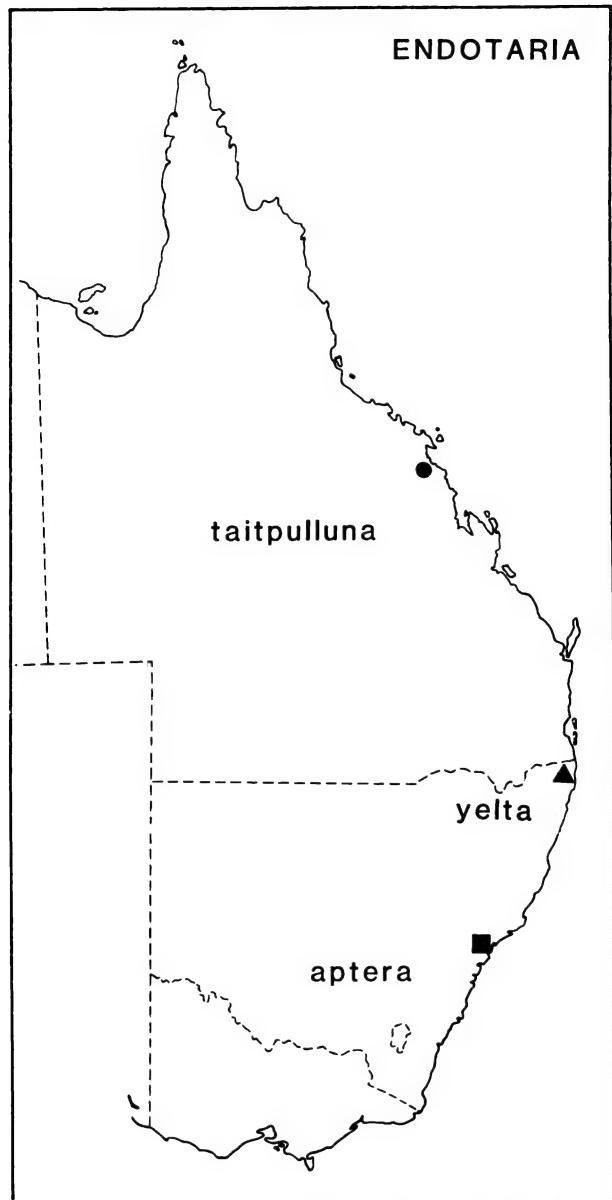


FIG. 201. *Endotaria* distributions.

RANGE. Type locality in central coastal NSW.

RECOGNITION. Males: Similar to *E. taitpulluna* but differing in shape of genitalia (Fig. 202A). Face and body marked as in *E. taitpulluna*. Tibia I with small inner tympanum. Femur III 1.11 times as long as tibia III and 4.55 times as long as pronotum. Body length ca. 12.5 mm; femur III length 9.5 mm.

HABITAT. Probably wet forests.

SPECIMENS. Holotype ♂ SAM.

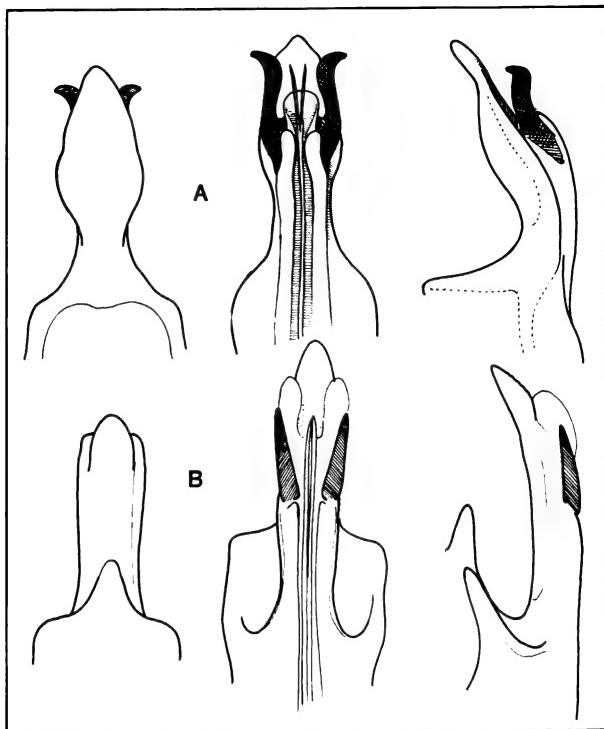


FIG. 202. *Endotaria* male genitalia; A, *aptera*; B, *taitpulluna*.

Endotaria taitpulluna n. sp., Figs. 193ADE, 202B

RANGE. Type locality in central coastal QLD.

RECOGNITION. Males: Body shape and coloration as in Fig. 200. Males completely wingless. Tibia I with very small and indistinct tympanum located

on most proximal pale band. Genitalia as in Fig. 202B. Coloration generally very similar to *Tathra* species. Tibia III with 3 inner and 4 outer subapical spurs (Fig. 193E). Femur III marked as in Fig. 193A. Side of head marked like *Tathra tatiara*. Front of face black but with pale yellowish median band running from median ocellus onto labrum. Femur III 1.14 times as long as tibia III. Tibia III 3.24 times as long as basitarsus III. Body length 12 mm; femur III 8.5 mm; cerci 9 mm.

HOLOTYPE. ♂, A-499, Eungella National Park, QLD, 20 ii 1969, ANC.

HABITAT. Mountain rain forest.

SPECIMENS. Holotype ♂ ANC.

Endotaria yelta n. sp., Figs. 189D, 200

RANGE. Type locality near Alstonville, NSW.

RECOGNITION. Very similar to above two species. Both sexes without auditory tympana. Male genitalia as in Fig. 182D. Body length 9–10 mm (♂); 10–12 mm (♀), femur III length 8.0–9.5 mm; cercal length 7–9 mm. Ovipositor 0.8–0.9 times as long as femur III.

HOLOTYPE. ♂, Rainforest Pitfall 41, Victoria Park, via Alstonville, NSW, 1974–1975, 213 m (G. B. and S. R. Monteith) QM.

HABITAT. All specimens caught in rainforest pitfall traps.

SPECIMENS. Holotype ♂ QM. Same data as holotype, 4♂ 14♀ QM.

SUBFAMILY ENOPTERINAE

Chopard (1968) included in the subfamily Eneopterinae four tribes: the Eneopterini with 13 genera, the Itarini with 6 genera, and the Podoscirtini with 55 genera. Chopard also placed the Hawaiian genus *Prognathogryllus* (Prognathogryllini) under this subfamily. But our examination of these crickets has revealed that they belong to the subfamily Oecanthinae and are most closely related to the genus *Xabea*. We here add 10 genera and 105 species.

RECOGNITION. This subfamily has the following distinguishing characteristics: (1) Second segment

of tarsi wide, dorso-ventrally flattened, and with large pads (shared only with Trigonidiinae) (Fig. 2). (2) Hind tibiae with both articulated spurs and shorter nonarticulated spines and usually with at least some spines located between spurs (Fig. 5C–F). The grylline genera, *Mjöbergella*, *Eurygryllodes*, and some *Apterogryllus* also possess spines but these are not arranged between the spurs (Fig. 5L). The Phalangopsinae bear spines between the spurs (Fig. 5GK) but in this group the 2nd tarsal segments are small and lack pads.

ENEOPTERINI

1. Middle outer apical spur (spur o-2) more than 2 times as long as adjacent spur (spur o-3) and longer than subapical spurs.
2. Outer tympanum large and inner one absent or slit-like.
3. Tibia III with 4 inner and 4 outer subapical spurs.
4. Males always with stridulum.
5. Mirror divided by 1 or 0 vein (or mirror absent).

ITARINI

1. Spur o-2 less than 2 times as long as o-3 and shorter than subapical spurs.
2. Outer tympanum and inner tympanum present (*Phaloria*), or outer one absent and inner one present (*Tremellia*).
3. Tibia III with 4 inner and 4 outer subapical spurs.
4. Males always with stridulum.
5. Mirror divided by 2 veins.

PODOSCIRTINI

1. Spur o-2 short, nearly equal to spur o-3 in length and much shorter than subapical spurs.
2. Tympana variable but never as in Eneopterini.
3. Tibia III with 4–6 inner and 4–6 outer subapical spurs.
4. Males sometimes without stridulum.
5. Mirror divided by 0 or 1 vein or mirror absent.

TRIBE ENEOPTERINI

Chopard (1968) includes the following genera in this tribe: *Eneoptera* (Central and South America), *Eneopteroides* (Peru), *Xenogryllus* (widespread from Africa to east Asia and Indonesia), *Nisitrus* (Indonesia), *Paranisitra* (Philippines), *Ponca* (Costa Rica), *Paraeneopterus* (Philippines, *P. handschini* of Chopard 1937 belongs to the genus *Salmanites*), *Swezwilderia* (Samoa), *Lygpterus* (Brazil), *Cardiodactylus* (Southeast Asia, southwest Pacific region, Australia), *Salmanites* (Australia), *Eurepa* (Australia), and *Lebinthus* (Australia).

Chopard included 7 genera belonging to this tribe in his 1951 monograph. To these we add three new genera: *Eurepella*, *Myara*, and *Arilpa* and 58 new species.

With the exception of *Cardiodactylus* which is known only from Queensland coastal and island habitats, this group is more or less restricted to the interior of Australia, but a few species reach the coast in drier regions.

Members of the genus *Eurepa* and *Myara* inhabit mainly tree trunks in Mallee scrub, Mulga scrub, and savanna woodland where they hide under bark in the daytime. Males sing either during the day or at night. *Eurepella* species live mainly in grass clumps in desert and semi-desert habitats, and males sing only late in the afternoon or at night.

Salmanites species live among grass clumps but move about on the ground and males sing almost exclusively in the daytime. *Arilpa* lives on gravelly soil among grass clumps and sings from late afternoon into the night. *Lebinthus miripara* was found among woody debris in open woodland. The songs of *Lebinthus* species are not known.

The Australian genera can be arranged into at least 5 genus groups as we have done below. Some of their principal recognition characters are given in Table 18.

Eurepa Genus Group

Eurepa—Stem and bark or grass-clump species; dry woodland and savanna.

Myara—Stem and bark species; open to dense dry woodland.

Eurepella Genus Group

Eurepella—Grass-clump species; desert and savannah grassland.

Arilpa—Gravel species; desert and semidesert.

Salmanites—Ground species; desert to savanna grassland and dunes.

Lebinthus Genus Group

Lebinthus—Ground and gravel species; open dry woodland.

Cardiodactylus Genus Group

Cardiodactylus—Coastal and island marsh woodland.

KEY TO GENERA OF TRIBE ENEOPTERINI

1. Male FW's less than twice as long as pronotum; without a mirror. Female FW's shorter than pronotum. Rostrum at least 3.4 times as wide as scape *Lebinthus*
Male FW's more than twice as long as pronotum; with mirror. Female FW's variable (absent, shorter or much longer than pronotum). Rostrum less than 3.3 times as wide as scape 2
2. Rostrum less than 1.8 times as wide as scape. Head more than 3.3 times as wide as rostrum. Mirror longer than wide 3
Rostrum always more than 1.8 times and usually more than 2 times as wide as scape. Head less than 3.2 times as wide as rostrum. Mirror width equal to or greater than mirror length (except in *Salmanites*) 5
3. Tibia I with a slit-like inner tympanal opening as well as an outer tympanum. Top of clypeus well below level of eyes. FW more than 5 times as long as pronotum and extending to end of abdomen or beyond. Male FW with small poorly defined mirror and very long apical area (Fig. 243A) *Cardiodactylus*
Tibia I with only an outer tympanum. Top of clypeus extending at least to level of antennae (Figs. 209, 218). And otherwise not fitting above description 4
4. Male genitalia with prominent downward projecting flanges (Fig. 208) *Eurepa*
Male genitalia without downward projecting flanges (Fig. 216) *Myara*
5. Mirror distinctly longer than wide (Fig. 238). Females

- usually without FW's (except *S. iknurra* and perhaps *S. obscurifrons*). Both sexes usually with dark median band on dorsum and on face (Fig. 237) *Salmanites*
Mirror wider than or roughly equal to length. Females with small to moderate FW's. Dorsum of body variable but always without strong median band on head and face. 6
6. Male genitalia with cup-shaped ectoparameres (Fig. 230). Pronotum usually about twice as wide as long. Female FW shorter than pronotum. File always with more than 70 teeth *Arilpa*
Male genitalia not as above. Pronotal width usually less than twice the length. Female FW longer than pronotum. File usually with more than 80 teeth (except Moojerra Group) *Eurepella*

EUREPA GENUS GROUP

Genus EUREPA Walker

Eurepa Walker 1869: 73. Type species: *Acheta marginipennis* White, by monotypy.

The species in this genus inhabit a variety of habitats. The species of the Marginipennis and Nurn-

dina groups usually live on the stems of trees, perhaps most often *Eucalyptus*, where they hide under strands of bark. They occasionally sing during the day but are more active at night.

The species in the Wirkutta and Woortooa groups are grass specialists and are often found in clumps of spinifex grass. Toward dusk males gradually emerge onto the tops of grass clumps and eventually sing from the highest grass stalks.

The genus can be arranged into the following species groups:

Marginipennis Group (bark and stem species)
 Nurndina Group (bark and stem species)
 Wircutta Group (grass-clump species)
 Woortooa Group (grass-clump species)

RECOGNITION. Very similar to the genus *Myara*, but differs rather strikingly in male genitalia; males of *Eurepa* have large, laterally flattened ectoparameres (Fig. 208). *Eurepa* and *Myara* share following characteristics: Rostral width less than 2 times scape width. Head width more than 3.2 times ros-

TABLE 18. Comparison of the genera in the tribe Eneopterini.

Genus	Rostral width ¹ scape width	Head width rostral width ¹	Mirror (length, L; width, W)	Median pronotal length		FW length median pronotal length (♂)	FW length femur III length (♂)	Female FW longer than pronotum	Ovipositor length femur III length
				greatest pronotal width (♂)	median pronotal length (♂)				
<i>Lebinthus</i>	3.4–4.2	2.4–2.6	absent	ca. 1.7	ca. 1.6	0.35–0.42	no	1.2–2.5	
<i>Salmanites</i>	2.6–3.3	2.3–2.9	W < L divided or undivided ³	1.6–1.9	2.6–3.4	0.6–0.8	usually absent ⁴	0.9–1.6	
<i>Eurepella</i>	2.2–2.9	2.5–3.2	W ≥ L divided	1.5–2.0	2.6–4.2	0.6–0.8	yes	0.8–1.2	
<i>Arilpa</i>	1.8–2.8	2.7–3.1	W ≥ L divided	1.8–2.1	2.7–4.1	0.5–0.8	no	ca. 1.0 ⁵	
<i>Eurepa</i>	0.8–1.7	3.3–6.0	W < L ² divided	1.4–1.8	4.0–4.6	0.8–1.0	yes	1.5–3.4	
<i>Myara</i>	1.0–1.8	3.4–5.0	W < L divided	1.4–1.7	3.1–4.1	0.7–1.0	yes	0.7–4.5	
<i>Cardiodactylus</i>	ca. 1.1	ca. 4.4	W < L irregular divided	ca. 1.5	ca. 5.3	0.9	yes	ca. 1.0	

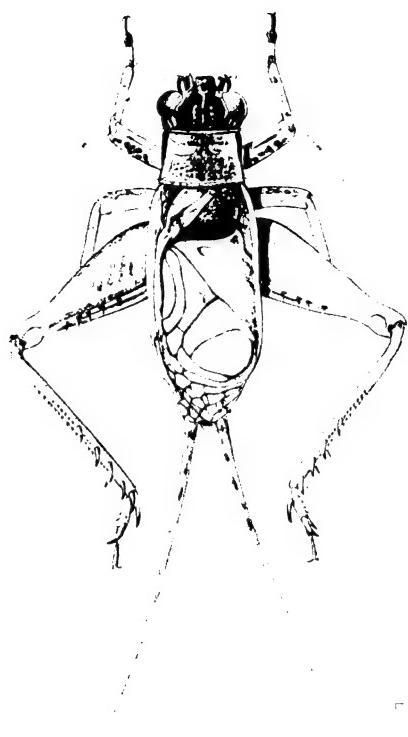
¹ Measured directly between the antennal scapes.

² Except *E. tanderra* and *E. wirkutta*.

³ Divided, dividing vein complete; undivided, dividing vein incomplete or absent.

⁴ Present in *S. iknurra* and about as long as pronotum; probably present in *S. obscurifrons*, but probably shorter than pronotum.

⁵ But females of most species not known.

FIG. 203. *Eurepa marginipennis*.

tral width. FW length more than 2 times its width. Mirror longer than wide. Female ovipositor long, ranging from 1.5 to 3.5 times as long as hind femur.

MARGINIPENNIS GROUP

The four species in this group are difficult to separate. All are from the southern half of the continent and all live on tree trunks.

RECOGNITION. See Table 19. Rostrum (at narrowest part) distinctly wider than scape (1.3–1.7 times as wide). Clypeus spotted (Fig. 209ABC) and not extending onto top of head. Vein 1A branched in basal area (Fig. 210A–E). Body color reddish brown and with distinct pale bands along the lateral margins of the dorsal field beginning on the pronotum and extending onto the FW's. Dorsum of head with reddish brown to dark brown band separated by narrower pale stripes (Fig. 209M). Disk of pronotum brown and somewhat speckled and becoming pale at lateral margins. Lateral pronotal lobes black in lower two thirds and pale at upper end. FW's with an opaque or milky area running between the M and R veins. Sc and R veins pale or yellow. Lateral field of FW's black below R vein. Dorsum of abdomen black; venter pale.

marginipennis

1. File with 110–138 teeth.
2. Rostrum ca. 1.3 times as wide as scape.
3. FW ca. 2.3 times as long as wide.
4. Mirror length ca. 1.4 times mirror width.

yumbena

1. File with 92–107 teeth.
2. Rostrum ca. 1.3 times as wide as scape.
3. FW ca. 2.3 times as long as wide.
4. Mirror length ca. 1.1 mirror width.

tanderra

1. File with ca. 157 teeth.
2. Rostrum ca. 1.5 times as wide as scape.
3. FW ca. 1.75 times as long as wide.
4. Mirror length ca. 0.9 times mirror width.

eeboolaga

1. File with 88 teeth.
2. Rostrum ca. 1.7 times as wide as scape.
3. FW ca. 2.25 times as long as wide.
4. Mirror length ca. 1.1 times mirror width.

TABLE 19. Comparison of *Eurepa* species groups.

Species group	Rostral width scape width	Clypeus strongly spotted (Fig. 209ABC)	Clypeus extends onto dorsum of head	Female FW's shorter than pronotum	Vein 1A of ♂ branched (Fig. 210A–F)	Dorsum of abdomen	Parameres extending beyond epiphallus (top view)
Marginipennis Group	1.3–1.7	yes	no	no	yes	black	no
Nurndina Group	ca. 0.9	no	no	no	yes	black	no
Wirkutta Group	ca. 0.8	no	no	no	no	black	no
Woortooa Group	ca. 1.0	no	yes	yes	no	with a median black band	yes



FIG. 204. *Eurepa quabara*.

***Eurepa marginipennis* (White), Figs. 203, 208A, 209M, 210AB**

Acheta marginipennis White 1841: 476. Holotype ♂, King George's Sound, Australia (Captain G. Grey) BM. Transferred to *Eurepa* by Chopard 1951. Type examined.

Piestodactylus longicauda Saussure 1878: 529. Chopard 1951: 486, synonym.

RANGE. Central NSW west to southwestern WA.

RECOGNITION. Males: Morphologically indistinguishable from *E. yumbena* except for song and file. File with 110–138 teeth (males collected by us). Genitalia as in Fig. 208A. FW length about 2.3 times FW width. Harp with 4 veins. Legs I and II rusty brown and spotted. Femur III reddish and with narrow darker stripes. Cerci brown. Body length ca. 11 mm; cerci ca. 15 mm.

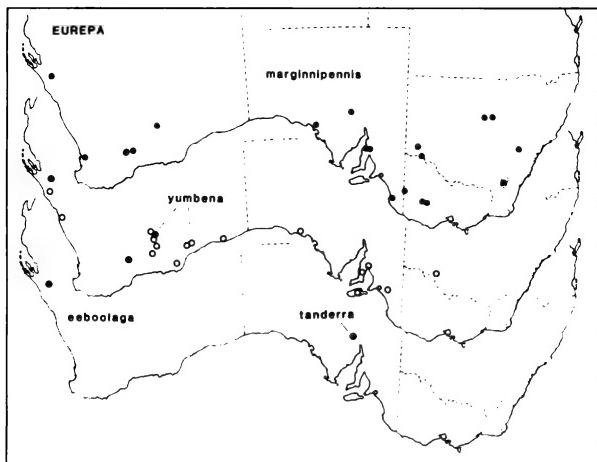


FIG. 205. Distributions of species of *Eurepa* species. Open circles, uncertain identification.

Females: No females collected along with taped males. Females associated with males believed to belong to *E. marginipennis* and unassociated females fall into three ovipositor length classes (see Variation). Cercal length in these females varies from 15 to 22 mm.

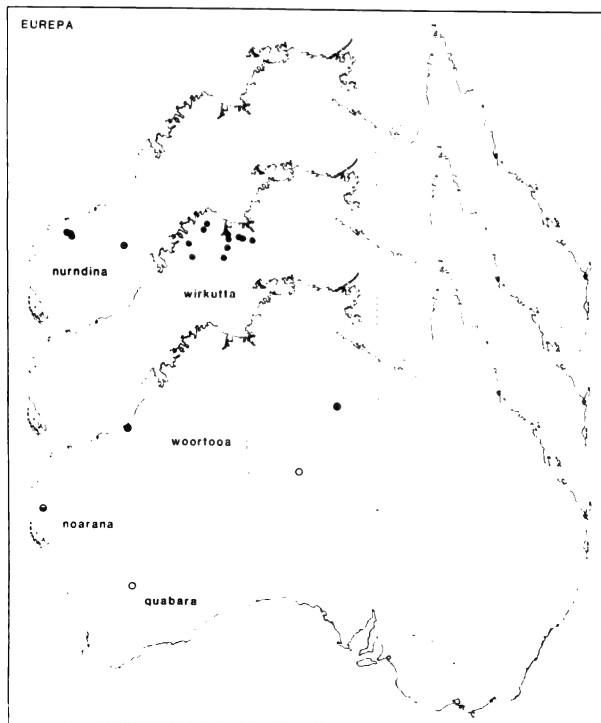


FIG. 206. Distributions of *Eurepa* species.

VARIATION. *E. marginipennis* varies considerably across its range in file count and ovipositor length. Females' ovipositors fall into three length classes and these are not closely correlated with geography. Very possibly the three groups of females given below belong to three species. Unfortunately no female *E. marginipennis* were collected with taped males. Therefore, if the females listed in Table 20 do belong to three species, we do not know which of them is *E. marginipennis*.

Males collected by us varied in number of file teeth as follows: A-331 (124 teeth); 363 (119, 130); 372 (131); 423 (127); 603 (114); 646 (129); 651 (113); 657 (118); 676 (113, 119); 677 (127). Other males believed to belong to this species had the following numbers of file teeth: 16 mi S Borden, WA (112 teeth); Bunburg, WA (115); Rocky R, Kangaroo I, SA (113); 41 km NE Nullarbor HS, SA (110); 11 mi E Mogriguy, NSW (138); 8 km WNW Balranald, NSW (120), Black Mt, ACT (118); 1 mi S Ouyen, VIC (115).

SONG. Fig. 207. More or less continuous trill. At A-676 heard singing at night 3 to 4 feet above ground in small trees with trunks 3 inches in diameter. Most individuals sang from tree trunks, usually partly under flap of *Eucalyptus* bark. Of 10 males none were on grass or ground, three were on branches or small bushes. These animals detected our approach, apparently visually, at several feet. When startled slightly they stopped stridulating but did not lower their tegmina.

		p/s	kps	°C
A-651	n=6	36.8-44.0	4.2-5.5	26
A-657		22.5	3.8	19
A-677		15.0	3.9	16
A-363	n=2	22.0, 25.3	4.2, 4.8	21
A-333		32.3	5.2	25
A-340		24.3	4.5	16
A-373		25.1	4.1	20
A-384		26.3	5.3	29
A-422		16.0	3.9	14
A-434		28.0	5.1	23
A-437		26.2	5.0	22
A-695		35.5	4.9	23

SPECIMENS. Note: It is difficult to separate males of *E. yumbena* and *E. marginipennis* and difficult to separate females of these two species and *E. tanderra* and *E. eeboolaga*. These records should therefore be treated with reservation. Specimens marked with * belong to the short ovipositor variety (see Table 20).

TABLE 20. Females in the Marginipennis Group examined in this study.

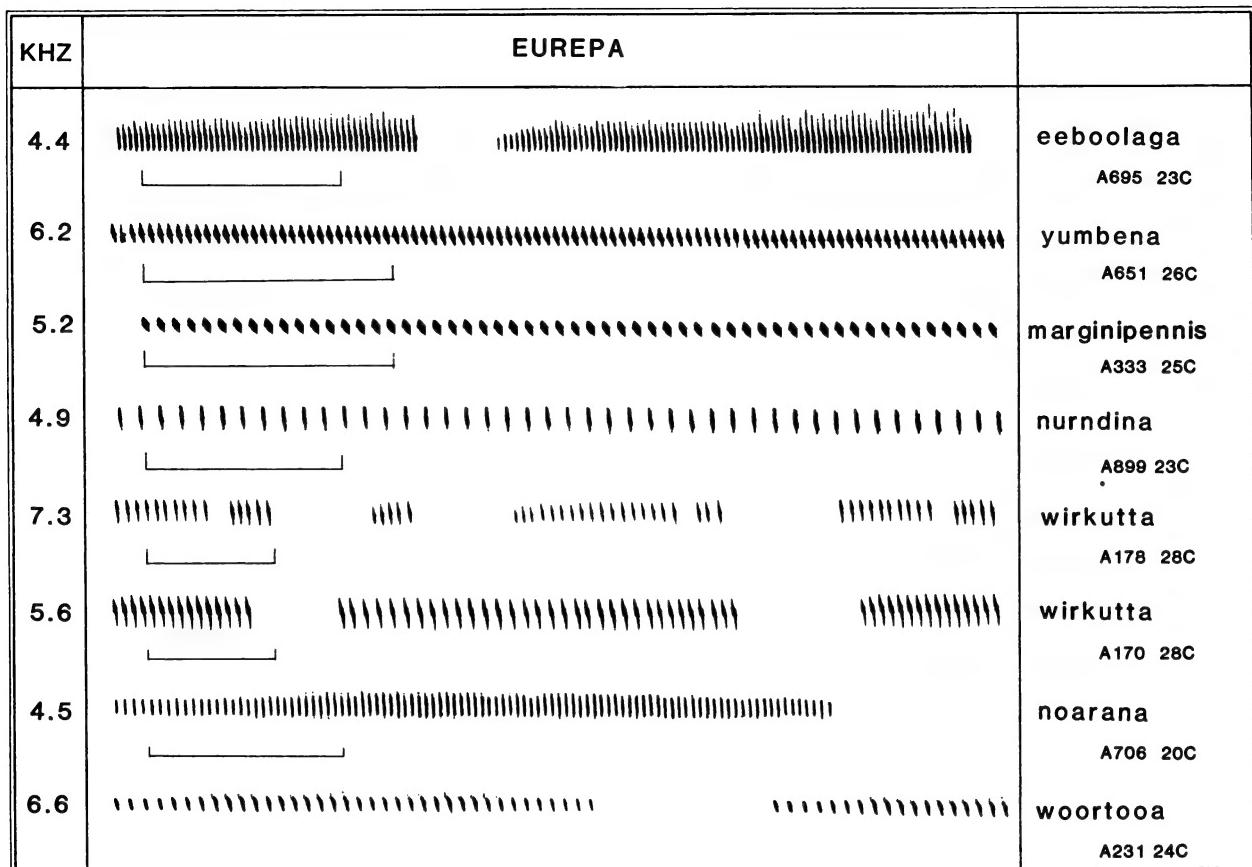
Locality	Femur III length	Ovipositor length	Ovipositor length/femur III length
Long ovipositors (<i>E. marginipennis</i>?)			
*8 km WNW Balranald, NSW	11.5	35	3.04
*8 km WNW Balranald, NSW	12	37	3.08
*8 km WNW Balranald, NSW	11	34	3.09
*7 km N Balranald, NSW	12	36	3.00
*1 km WNW Balladonia Motel, WA	11.5	39	3.39
Intermediate ovipositors (<i>E. yumbena</i>?)			
7 mi ESE Dongara, WA	11	25	2.27
3 km SE Widgiemooltha, WA	10	27	2.7
21 km SSE Kalgoorlie, WA	11	27.5	2.5
21 km SSE Kalgoorlie, WA	10.7	26.5	2.48
21 km SSE Kalgoorlie, WA	10.5	26.5	2.52
25 km NW Kalgoorlie, WA	10.3	27	2.62
35 km SSW Norseman, WA	10.3	24	2.33
Yumali, SA	10	22	2.2
Yumali, SA	10	24	2.4
Yumali, SA	10	24	2.4
Kangaroo I, SA	10	25	2.5
1 mi WNW Ardrossan, SA	10	25	2.5
Port Clinton, SA	10	27	2.7
3 mi W Bookabie, SA	10	25	2.5
3 mi W Bookabie, SA	10	27	2.7
2 mi W Balranald, NSW	9	24	2.67
Kewell, VIC	10	23	2.3

Short ovipositors (species? variety of *E. marginipennis*?)

21 km SW Mt Ragged, WA	9.5	20	2.11
76 km SW Mt Aloysius, WA	9.5	17.5	1.84
23 km WNW Mt Arid, WA	9.3	17	1.83
7 mi S Putty, NSW	10	19	1.90
Korren (State?)	8.9	16	1.8
*Black Mt ACT	10	18	1.8

* Typical *E. marginipennis* males (by file and genitalia) were collected at the same place.

Holotype ♂ BM. A-331 8♂ ANC. A-363 2♂ ANC. A-372 3♂ ANSP. A-423 1♂ ANC. A-603 1♂ ANC. A-646 1♂ ANC. A-651 1♂ ANC. A-657 1♂ ANC. A-676 2♂ UM. A-677 1♂ ANC. WESTERN AUSTRALIA: 1 mi WNW of Balladonia Motel, 3 xi 1969 (Key, Upton) 1♂ 1♀ ANC. *33.34S 123.19E, 21 km SW of Mt Ragged, 15 ii 1978 (Rentz, White) 1♀ ANC. *26.06S 127.51E, 76 km W by S of Mt Aloysius, 16 xi 1977 (Upton, Feehan) 1♀ ANC. *33.51S 123.00E, Thomas R, 23 km NW by W of Mt Arid, 4 xi 1977 (Upton, Feehan) 1♀ ANC. 16 mi S of Borden, 9 x 1951 (Common)

FIG. 207. *Eurepa* songs. Scale = 0.5 s.

1♂ ANC. Bunbury, 7 xii 1956 (Snell) 1♂ ANC. SOUTH AUSTRALIA: 31.21S 131.19E, 41 km E by N of Nullarbor HS, 24 x 1977 (Upton) 2♂ ANC. 2 mi SSE of Ceduna, 30 x 1969 (Key, Upton) 1♂ ANC. Rocky R, Kangaroo Island, xii 1934. 1♂ SAM. NEW SOUTH WALES: ca. 8 km WNW of Balranald, 5 ii 1978 (Rentz) 1♂ 3♀ ANC. 34.35S 143.34E, 7 km N of Balranald, 30 xi 1977 (Rentz, Rentz) 1♂ 3♀ ANC. Mt Arthur, 3 mi W of Wellington, 10 ii 1954 (Key) 1♂ ANC. 11 mi E of Mogriguy, 30 x 1967 (Key) 1♂ ANC. *7 mi S of Putty, 10 xii 1955 (White) 1♀ ANC. AUSTRALIAN CAPITAL TERRITORY: Black Mt, 4 xii 1968 (Common) 1♂ ANC. Black Mt, 16 i 1962 (Common) 1♀ ANC. Canberra, 2 i 1961 (Strautmanis) 1♂ ANC. Canberra, 26 i 1962 (Chinnick) 1♂ ANC. Canberra, 1♂ ANC. Yass, 21 xii 1925 (English) 1♂ ANC. VICTORIA: 1 mi S of Ouyen, 14 iii 1966 (Upton, Grant) 1♂ ANC. *Kewell, 1♀ ANC. Stawell, 12 v 1925 (Hill) 1♂ ANC.

Eurepa yumbena n. sp., Figs. 208D, 209BM, 210C

RANGE. Southwestern WA, possibly extending to SA and NSW.

RECOGNITION. Males: Almost indistinguishable from *E. marginipennis* but file with 92–107 teeth.

Genitalia also similar (Fig. 208D), but male from A-676 with somewhat different genitalia. This male had faster trill and its file possesses 92 teeth. Other males believed to belong to this species had following number of file teeth: 8 km N Norseman, WA (89); 11 and 25 km E Balladonia, WA (94, 94); 21 km SSE Kalgoorlie (104); Red Bluff, WNW of Ajana, WA (104); 4 mi WSW Mt Ragged, WA (107); 24 mi WSW Madura, WA (95). Holotype measurements: Distance between antennal sockets 1.29 times width of scape. Head width 4.0 times distance between antennal sockets. FW length 2.32 times its width. Cercal length 1.07 times body length. Mirror length 1.07 times its width. Stridulatory file with 95 teeth. Body length 15 mm; cerci ca. 16 mm (tip broken).

HOLOTYPE. ♂, A-651, N of Widgiemooltha, near Norseman, WA, 14 iv 1969, ANC.

SONG. Fig. 207. Continuous trill.

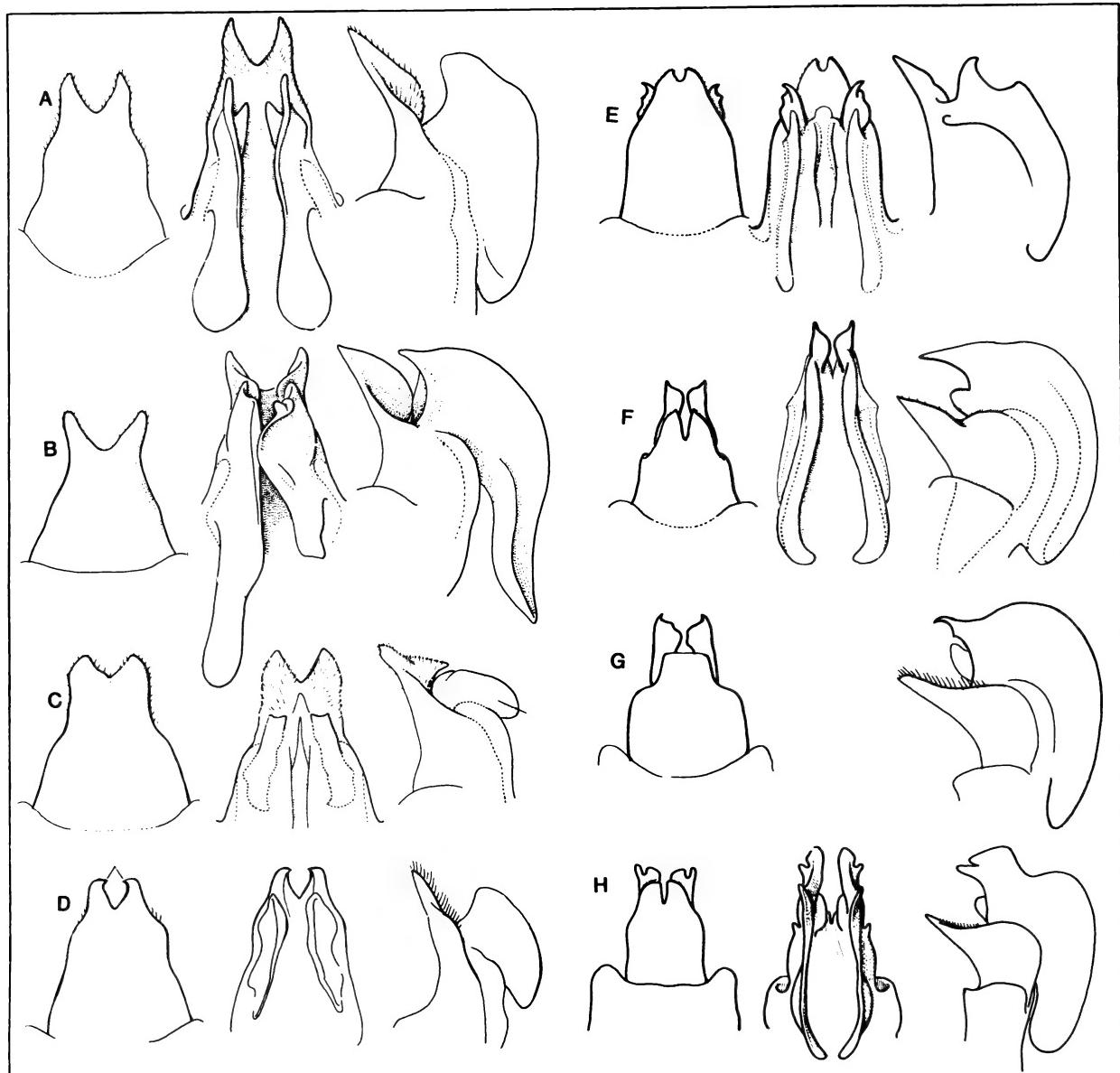


FIG. 208. *Eurepa* male genitalia (dorsal, ventral, and lateral views). A, *marginipennis*; B, *nurndina*; C, *tanderra*; D, *yumbena*; E, *wirkutta*; F, *woortooa*; G, *noarana*; H, *quabara*.

	p/s	kps	°C
A-651	52.0–52.5	6.1–6.4	ca. 26
A-696	40.0	5.2	21–23

HABITAT. Tree stems in mallee and mulga scrub.

SPECIMENS. See note under *E. marginipennis* specimens. A-651 3♂ ANC. A-676 1♂ ANC. WESTERN AUSTRALIA: 31.31S 121.35E, 3 km SE of Widgiemooltha, 21 ii 1978 (Rentz) 4♂ 1♀

ANC. 30.54S 121.32E, 21 km SSE of Kalgoorlie, 17 ii 1978 (Rentz, White) 1♂ 3♀ ANC. 30.31S 121.24E, 25 km N by W of Kalgoorlie, 18 ii 1978 (Rentz, White) 2♂ 2♀ ANC. 11 km E of Balladonia HS, 7 ix 1974 (John, Freeman) 2♂ ANC. 7 mi ESE of Dongara, 17 iv 1968 (Common, Upton) 1♀ ANC. Red Bluff, WNW of Ajana, 25 xi 1971 (McFarland) 1♂ ANC. 33.28S 123.26E, 4 km WSW of Mt Ragged, 27 x 1977 (Upton, Feehan) 1♂ ANC. 24 mi WSW of Madura, 30 iv 1968 (Common, Upton) 1♂ ANC. 32.38S 121.29E, 35 mi SW by S of Norseman, 17 xi 1969 (Key, Upton) 1♀ ANC. 32.25S 124.17E, 25 mi E by N of Balladonia HS, 3 xi

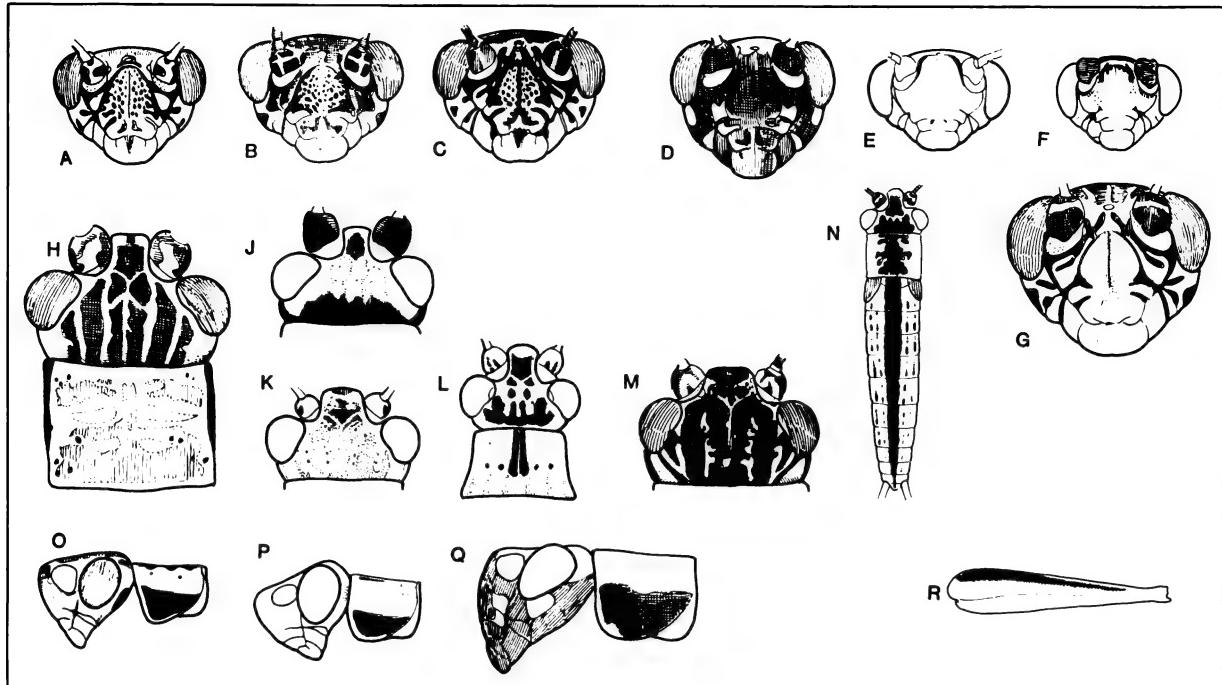


FIG. 209. *Eurepa*. A, *tanderra* holotype; B, *yumbena* holotype; C, *marginipennis*; D, *wirkutta*; E, *quabara* ♀; F, *woortooa*; G, *nurndina* ♀; H, *nurndina* ♀; J, *wirkutta*; K, *tanderra* holotype; L, *quabara* holotype; M, *marginipennis* and *yumbena*; N, *quabara* ♀ Narwietooma NT; O, *woortooa* paratype; P, *quabara* holotype; Q, *wirkutta* paratype; R, *quabara* ♀ Narwietooma.

1969 (Key, Upton) 1♂ ANC. 8 km N Norseman, 30 x 1963 (Sedlacek) 2♂ BISH. SOUTH AUSTRALIA: 35.31S 139.45E, Yumali, 12 xii 1977 (Rentz, Rentz) 2♀ ANC. 35.48S 138.04E, Chapman R crossing nr Lashmars Lagoon, Kangaroo Isl, 10 xii 1977 (Rentz, Rentz) 1♀ ANC. 1 mi WNW of Ardrossan, 27 i 1952 (Cane) 1♀ ANC. Port Clinton, 29 xii 1954 (White) 1♀ ANC. 3 mi W of Bookabie, 2 x 1968 (Key, Upton, Balderson) 1♂ 2♀ ANC. NEW SOUTH WALES: 2 mi W of Balranald, 6 v 1968 (Common, Upton) 1♀ ANC.

Eurepa tanderra n. sp., Figs. 208C, 209AK, 210E

RANGE. Type locality in southcentral SA.

RECOGNITION. Males: Very similar to *E. yumbena* and *E. marginipennis* but differing as follows: Genitalia as in Fig. 208C; stridulatory file with 157 teeth ($n=1$). FW relatively wider (Fig. 210E). Distance between antennal sockets 1.54 times width of basal antennal segment. Width of head 3.25 times distance between antennal sockets. Wing length 1.77 times wing width. Mirror length 0.92 times mirror width. Harp with 3 veins. Body length 13.5 mm.

HOLOTYPE. ♂, A-390, 43 miles NW of Port Augusta, SA, 11 i 1968, ANC.

SONG. Not known.

HABITAT. Mulga scrub; on tree trunk.

SPECIMENS. Holotype ♂ ANC.

Eurepa eeboolaga n. sp., Fig. 210D

RANGE. Type locality in extreme western WA.

RECOGNITION. Males: Very similar to *E. marginipennis* and *E. yumbena*. It cannot be distinguished from *E. yumbena* by either genitalia or number of file teeth (it has ca. 88 teeth). Distinguished from *E. marginipennis* only by number of file teeth. Distinguished from both species by its song which is trill with fast pulse rate (Fig. 207). Holotype measurements: Distance between antennal sockets 1.67 times width of basal antennal segment. Width of head 3.4 times distance between antennal sockets. Wing length 2.25 times wing width. Mirror length 1.10 times width. 4 oblique veins. File with 88 teeth. Body length 14 mm. Cerci broken.

Females: Coloration similar to male. Generally rusty brown with pale bands running along dorsal

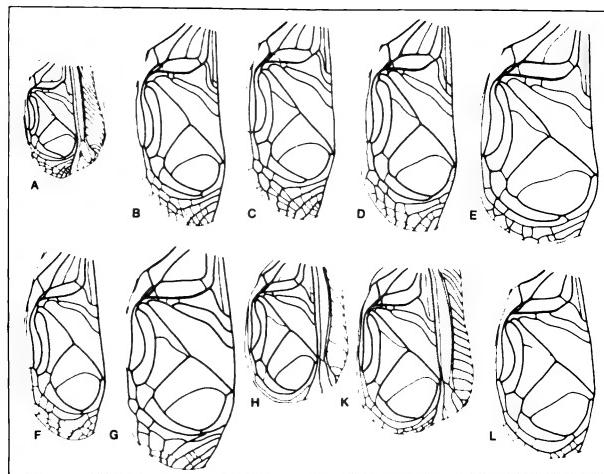


FIG. 210. *Eurepa* forewings. A, B, *marginipennis*; C, *yumbena* holotype; D, *eeboolaga* holotype; E, *tanderra* holotype; F, *nurndina* paratype; G, *wirkutta* holotype; H, *noarana* holotype; K, *quabara* paratype; L, *woortooa* holotype.

margins of body, from back of eyes to end of FW's. Lower $\frac{2}{3}$ of lateral lobes black. FW's extend to approximately middle of abdomen. Tergum of abdomen rusty brown but with three bands of darker markings—one medial one and one each along lateral margins. Ovipositor 2.4–2.7 times as long as femur III. FW length 8.2–9.5 mm; femur III 11–12 mm; ovipositor 27–32 mm; cerci more than 15 mm.

HOLOTYPE. ♂, A-695, 99 miles north of Geraldton, WA, 10 v 1969, ANC.

SONG. Fig. 207. Broken trill with fast pulse rate (60–64 pulses per second at 23°C). Most trills by one male collected at A-695 had around 50 pulses in each trill. In another male trills were more variable in length.

	p/s	kps	°C
A-695	60*	4.4	ca. 23
A-695	64	4.4	23

* Shorter trills of irregular length.

HABITAT. Eucalyptus trunks.

SPECIMENS. Holotype ♂ ANC. A-695 3♀ ANC.

NURNDINA GROUP

This "group" includes only *E. nurndina*. See Table 19 and Recognition below for identification.

Eurepa nurndina n. sp., Figs. 208B, 209GH, 210F

RANGE. Northwestern WA.

RECOGNITION. Males: Similar to *E. yumbena* and *E. marginipennis* but differing as follows: Genitalia as in Fig. 208B; file with 93, 94 teeth; head and pronotum not as red and stripes on top of head more grey than rusty; face and side of head with series of distinct stripes (Fig. 209G); face (front view) with median brown stripe which descends face to clypeus, on clypeus stripe splits into two forks forming inverted Y. HW's extending beyond FW's. FW's without vein connecting from mirror or diagonal vein to chord Cu₂. FW veins, especially in apical area, lighter than surrounding wing membrane. Distance between antennal sockets 0.89 times width of basal antennal segment. Head width 4.63 times distance between antennal sockets. Wing length 2.28 times wing width. Cercal length 1.25 times body length. Mirror length 1.24 times mirror width. Body length 14 mm; cercal length 17.5 mm.

Females: Coloration similar to male. FW's extending to about middle of abdomen. HW just protruding beyond FW. Body length ca. 17 mm. Ovipositor 1.5–1.7 times as long as femur III. Femur III 11.5–13.6 mm; cerci 19–20 mm; FW length 7.3–9.5 mm.

HOLOTYPE. ♂, A-899, 39 miles south of Nullagine, WA, 20 v 1969, ANC.

SONG. Fig. 207. Continuous trill of very short pulses at about 20 pulses per second at 23.5°C.

	p/s	kps	°C
A-899	19 (short pulses)	4.9	23

HABITAT. Probably tree trunks in eucalyptus woodland.

SPECIMENS. Holotype ♂ ANC. A-899 4♀ ANC, 1♂ ANSP. 35 km SW Millstream HS, 116.51E, WA, 25 iv 1971 (Key et al.) 1♂ ANC. 36 km SW Millstream HS, WA, 25 iv 1971 (Key et al.) 1♀ ANC. 1 km NNE Millstream HS, WA, 10 iv 1971 (Upton, Mitchell) 1♀ ANC. 4 km ESE Millstream HS, WA, 18 iv 1971 (Upton, Mitchell) 1♀ ANC.

WIRKUTTA GROUP

This "group" contains only *E. wirkutta*. See Table 19 and Recognition below for identification.

Eurepa wirkutta n. sp., Figs. 208E, 209DJQ, 210G

RANGE. Kimberley region of WA and northwestern NT.

RECOGNITION. Males: Genitalia as in Fig. 208E.

File with 149–155 teeth. Body color pale brown except for black abdomen. Face reddish above clypeus. Top of head very pale yellow brown, but becoming decidedly darker along back of head. Pronotal disk very pale, but lateral lobes with reddish pigmentation in bottom $\frac{1}{2}$ to $\frac{2}{3}$. Femora I and II light red-brown. Hind femur almost orange. FW's pale and somewhat translucent. Membrane between radius and subcosta milky-opaque. FW veins pale, yellowish. Venter of abdomen very pale, including subgenital plate which has thin medial brown streak. FW membrane in region of chords milky-opaque (between veins 1A and 2A). Mirror with one dividing vein. Three harp veins. Genitalia as in Fig. 208E. Male files vary as follows: A-170 (149), A-174 (173), A-785 (151, 153), Drysdale River (155), Kununurra (166). Holotype measurements: File with 149 teeth. Distance between antennal sockets 0.79 times width of scape. Width of head 6.0 times distance between antennal sockets. Wing length 1.88 times its width. Cerci 1.36 times as long as body. Mirror slightly wider than long. Body length 14 mm, cerci ca. 19 mm.

Females: Similar to male in size and color. Ovipositor 2.63 times as long as femur III. Cerci 2.54 times as long as femur III. FW 0.57 times as long as femur III. Femur III 11.4 mm; ovipositor 30 mm; cerci 29 mm.

HOLOTYPE. ♂, A-170, Saddle Creek, west of Timber Creek, NT, 30 ix 1964, ANC.

SONG. Fig. 207. Loud, clear trills from one to several seconds long, in which pulse rate shifts back and forth between faster and slower rate—sometimes with momentary breaks between them. At A-170 two males seemed to sing only trills of 15 p/s, while two others began at 19 p/s and after 25–30 pulses speeded up to 26 p/s.

	p/s		kps	°C
	slower part	faster part		
A-170	—	26.2	5.6	28
A-170	18.6	26	5.6	28
A-170	15.2	—	5.5	28
A-170	15.0–16.0	—	5.6	28
A-178	24.4	28	7.3	32
A-178	24.4	25	5.5	32

HABITAT. Collected on green bushes and on grass stems 2–4 feet above ground.

SPECIMENS. Holotype ♂ ANC. A-170 2♂ UM. A-174 1♂ ANSP. A-785 2♂ ANC. 14.39S 126.57E, Drysdale R, Kimberley dist, WA, 18–21 viii 1975 (Common, Upton) 1♂ ANC. 15.02S 126.55E, Drysdale R, Kimberley dist, WA, 3–8 viii 1975 (Common, Upton) 1♀ ANC. Kununurra, WA, 9 iv 1962 (Common) 1♂ ANC. 15.02S 126.40E, Morgan Falls, Kimberley dist, WA, 17 viii 1975 (Common, Upton) 1♂ ANC. 15.07S 125.33E, Prince Regent River Reserve, WA, 17 viii 1974 (Bailey, Richards) 1♂ ANC.

LISTENING RECORDS. A-175, A-178, A-180, A-183, A-186.

WOORTOOA GROUP

The three species in this group are from northern Australia. Unlike the previous three species groups, males and females have a black median band on the tergum (Fig. 209N), the cerci are very long, and female FW's are tiny (see also Table 19). Femur III has a brown band along the upper outer face.

woortooa

1. File with 108–121 teeth (n=3).
2. Cerci ca 3.4 times as long as femur III.
3. FW ca. 1.0 times as long as femur III.
4. Ovipositor length not known.

noarana

1. File with 30 teeth (n=1).
2. Cerci ca. 4.8 times as long as femur III.
3. FW ca. 0.8 times as long as femur III.
4. Ovipositor ca. 2.4 times as long as femur III.

quabara

1. File with 93 teeth (n=1).
2. Cerci ca. 4.5 times as long as femur III.
3. FW ca. 1.0 times as long as femur III.
4. Ovipositor 2.1–2.2 times as long as femur III.

Eurepa woortooa n. sp., Figs. 208F, 209FO, 210L

RANGE. Central NT to northwestern WA.

RECOGNITION. Males: Yellowish brown species with very long cerci. Top of head and pronotum with symmetrical brown markings on yellow to pale tan background. Scape dark brown. Lateral lobes pale in top half and dark brown in bottom half. Femora I and II pale proximally but dark brown in remaining length. Tibiae I and II mostly brown. Femur III (side view) dark brown along top half and pale along bottom half. Tibia III light brown. Mirror with complete dividing vein and three oblique veins. FW's somewhat transparent and with brown veins. File with 108–121 teeth (n=3). Membrane between chords 1A and 2A milky-opaque. Dorsum of abdomen pale but with medial brown band (somewhat less in width than width of abdominal segment) running entire length of abdomen. Each tergite also possesses rows of widely spaced brown spots running laterally. Genitalia as in Fig. 208F.

Holotype measurements: Body length 13.3 mm. Cercal length 24 mm. FW length 7 mm. Distance between antennal sockets 1.04 times width of basal antennal segment. Width of head 4.2 times distance between antennal sockets. Length of wing 2.0 times its width. Cercal length 1.8 times body length. Mirror length 1.03 times mirror width. No vein connecting front of mirror to chord Cu₂ on right (upper) wing, but vein present on lower wing. File with 121 teeth.

HOLOTYPE. ♂, A-751, 263 miles northeast of Port Hedland, WA, 13 v 1969, ANC.

SONG. Fig. 207. Series of trills of irregular length from about $\frac{2}{3}$ s to 3 s with momentary breaks between them. About 6 trills delivered in 10 seconds of singing by one male.

	p/s	kps	°C
A-231 n=5	35.6-38.3	6.2-6.3	ca. 24
A-751	30.0-31.0	5.3	18

HABITAT. Found in spinifex grass, singing near tops of stems.

SPECIMENS. Holotype ♂ ANC. A-231 2♂ ANC. A-751 1♂ ANSP.

Eurepa noarana n. sp., Figs. 208G, 210H

RANGE. Type locality in extreme northwestern WA.

RECOGNITION. Males: Most similar to *E. woortooa*, but differing principally in length of cerci. In *E. noarana* the cerci are about 4 times as long as the body while in *E. woortooa* they are only about twice as long. In *E. noarana* the frons is somewhat pointed (top view) and in *E. woortooa* it is broadly rounded and more truncate in appearance. Top of head and pronotum with patchwork of dark brown markings. Lateral region of dorsum with broad longitudinal pale band. Lower third of lateral lobes dark brown. Face pale, yellowish. Femora I and II mostly dark brown on external surface. Tibiae I, II, and III dark brown. Dorsum of abdomen mostly pale with small dots, but with median dark band running length of abdomen. Ventral abdomen pale. Harp with 3 veins. File with 30 teeth. Incomplete vein connects posterior part of diagonal vein to anterior part of chord Cu₂. FW's translucent and with contrasting dark brown veins. Femur III with broad dark brown band running along top surface of fe-

mur. Body measurements: Body length 13.5 mm. Cercal length 43 mm. Distance between antennal sockets 1.00 times width of basal antennal segment. Width of head 4.14 times distance between antennal sockets. Wing length 2.00 times wing width. Mirror length 1.17 times mirror width.

Females: Coloration very similar to male except tergites of abdomen bordered along lateral margins with broad brown band. FW's very tiny, shorter than femur I and not touching one another medially. Body length 15 mm. Ovipositor length 21 mm. Cercal length 35 mm. Ovipositor 2.44 times as long as femur III.

HOLOTYPE. ♂, A-706, 54 miles north of the Gascoyne River, WA, 12 v 1969, ANC.

SONG. Fig. 207. Trills lasting almost 2 seconds and containing 89-100 pulses.

	p/s	kps	°C
A-706	48*	4.4	19
A-706	54.7	4.4	19
A-706	56.7	4.5	19

* Broken trills.

HABITAT. Males found singing on spinifex grass.

SPECIMENS. Holotype ♂ ANC. A-706 1♀ ANC.

Eurepa quabara n. sp., Figs. 204, 208H, 209ENPR, 210K

RANGE. Southern NT to southwestern WA.

RECOGNITION. Males: Similar to *E. woortooa* and *E. noarana* but differing in male genitalia, and numbers of file teeth. Face and top of head as in Figs. 209L. File with 93 teeth (holotype). Dorsum of abdomen with median black band about as wide as rostrum. FW venation as in Fig. 210K. FW 4.69 times as long as pronotum and 0.95 times as long as femur III. Cerci 4.54 times as long as femur III. Femur III length 7.3 mm; cerci 33 mm.

Females: Dorsum of body marked as in Fig. 209N. Femur III marked as in Fig. 209R. Upper and outer face of femur I dark brown. Inner face of femur II dark brown. Abdominal tergites blackish medially and laterally. Ovipositor 2.12-2.22 times as long as femur III. FW very tiny, about 0.7-1.0 mm long. Femur III 8.5, 9 mm; ovipositor ca. 20, 18 mm.

HOLOTYPE. ♂, 17 mi ESE Giles, WA, 26 iii 1963
(L. J. Chinnick) ANC.

SONG. Not known.

HABITAT. Probably inhabits spinifex grass clumps.

SPECIMENS. Holotype ♂ ANC. 17 mi ESE Giles, WA, 26 iii 1963 (Chinnick) 3♂ 1♀ ANC. 23 mi N Narwietooma HS, NT, 10 iv 1963 (Chinnick) 1♂ 1♀ ANC.

MYARA n. gen.

TYPE SPECIES. *Myara unicolor* (Chopard).

This genus is widespread in Australia. All of the species apparently inhabit the stems of trees where they seek refuge in crevices and under bark. The species we collected sing during the daytime as well as at night.

RECOGNITION. This genus is most similar to *Eurepa* from which it differs in genitalic configuration (Fig. 216). In *Eurepa* the genitalia possess ectoparameres which project downwards, forming narrow, laterally flattened flanges (Fig. 208); *Myara* genitalia lack these processes. Like *Eurepa*, the species of *Myara* possess the following features: Head at least 3.3 times as wide as rostrum. Rostrum less than twice width of basal antennal segments. FW almost twice as long as wide and 3.1–4.1 times as long as the pronotum. Face strongly marked or spotted (Fig. 218A–M). Mirror longer than wide (see also Table 18). Female FW much longer than pronotum. Ovipositor 0.7 to 4.5 times as long as femur III.

Unicolor Group

1. Face and especially clypeus strongly spotted (largely black but still faintly spotted in *M. unicolor*) (Fig. 218HJKLM).
2. Clypeus extends onto dorsum of head.
3. Dorsum of wing area without lateral pale stripes. Area between R and M veins in male FW and between Sc and R veins in females, dark.

Sordida Group

1. Face with broad dark bands; clypeus not strongly spotted (Fig. 218BDEFG).
2. Clypeus not reaching dorsum of head.
3. Dorsum of wing area with lateral pale stripes; area between veins R and M (males) or Sc and R veins (females) pale brown or yellow.

Pakaria Group

1. Face with broad dark bands; clypeus not strongly spotted (Fig. 218C).
2. Clypeus not reaching dorsum of head.
3. Dorsum of wing area without lateral pale stripes (similar to Unicolor Group).

UNICOLOR GROUP

The four species in this group are mainly from the southern half of the continent. They have a clypeus which is spotted (sometimes only faintly in *M. unicolor*) and which extends onto the dorsum of the head. Unlike the Sordida Group (but like the Pakaria Group) the area between the R and M veins in males (Sc and R veins in females) is dark.

KEY TO SPECIES OF UNICOLOR GROUP

1. Clypeus extremely produced (Fig. 217H). Femur III marked as in Fig. 218T. Ovipositor more than 4 times as long as femur III *mabanuria*
- Clypeus not as above. Femur III not as above. Ovipositor less than 3.5 times as long as femur III 2
2. Head and pronotum black. Venter of scape entirely black (Fig. 218M). SA and WA *unicolor*
- Head and pronotum with distinct light and dark areas. Venter of scape with light and dark areas (Fig. 218HJKL) 3
3. Eyes with narrow vertical stripes. Inner face of femur III entirely black. Legs I and II dark reddish. (Central QLD) *yurgama*
- Eyes without vertical stripes. Inner face of femur III not black. Legs I and II with dark spots and streaks 4
4. Outer and upper faces of femur III with numerous small oblique stripes (Fig. 218S). Side of head and pronotum marked as in Fig. 217K *merimbula*
- Outer face of femur III with a broad longitudinal dark band (Fig. 218R). Side of head and pronotum marked as in Fig. 217M *aperta*

Myara unicolor (Chopard), Figs. 216A, 217F, 218MP

Eurepa unicolor Chopard 1951: 486. Holotype ♂, Ooldea, SA (A. M. Lea) SAM. Type examined.

RANGE. Central SA to southwestern WA.

RECOGNITION. Males: Very dark reddish brown with reddish hind femora. Face nearly black. Top of head and entire pronotum nearly unicolorous dark red-brown. Abdomen almost black on dorsum, very pale on venter. Subgenital plate black. FW's brown and with contrasting pale veins. Mirror completely divided. Vein connects anterior mirror to chord Cu₂. Harp with 3 or 4 veins (holotype has 4). FW angle without broad pale band as in *M. sordida*. Legs I, II, and III yellow to orange-brown. Cerci pale brown, shorter than body. Genitalia as in Fig. 216A. Stridulatory file with 103–111 teeth (A–378, 103 teeth; A–638, 111 teeth). Body length ca. 17 mm. Cercal length ca. 13 mm. Other data given in Table 21.

TABLE 21. Comparison of *Myara* species.

Species and range	Clypeus extending onto dorsum and spotted	♂ FW yellow or pale between M and R veins	Number of file teeth	Legs I, II pale with dark spots and stripes	Ovipositor length femur III length	Other distinguishing features
<i>sordida</i> E QLD	no	yes	120–143 n=6	no	1.38	chordal area dark (cf. <i>wintrena</i>)
<i>wintrena</i> NE QLD	no	yes	54, 55	no	1.0–1.1 n=4	chordal area yellow (cf. <i>sordida</i>)
<i>yabmanna</i> NE NT	no	yes	98	no	0.74–0.86 n=5	
<i>warratinna</i> NE WA	no	yes	135	no	♀ not known	
<i>erola</i> Crawley, WA	no*	♂ not known	♂ not known	no	2.3	
<i>pakaria</i> SE QLD	no	no	124–127 n=4	no	1.3–1.8 n=8	
<i>multaburra</i> central QLD	no	no	153–171 n=6	no	1.3–1.5 n=2	
<i>unicolor</i> SA to WA	yes**	no	103–137 n=5	no	2.8–3.1 n=3	head and pronotum all black.
<i>yurgama</i> central QLD	yes	no	64, 72	no	♀ not known	inner face of femur III entirely black.
<i>aperta</i> NW QLD	yes	no	124	yes	♀ not known	upper outer face of femur III with broad dark band.
<i>merimbula</i> central QLD	yes	no	80–98 n=3	yes	1.5	outer face of femur III finely and distinctly striped.
<i>mabanuria</i> W WA	yes	probably no	♂ not known	no	4.5	clypeus strongly bulging.

* Clypeus finely speckled but not reaching dorsum.

** Sometimes entirely black.

Females: Similar to male in color. Ovipositor 2.8–3.1 times as long as femur III. FW 0.48–0.53 times as long as femur III. Cerci 1.36–1.42 times as long as femur III. FW length 6.3–7 mm; femur III length 12–14.5 mm; ovipositor length 37.5–40 mm; cercal length 17–20 mm.

SONG. Fig. 215. Succession of short trills with about 20 pulses each; about 1 trill per second.

HABITAT. Found singing on mulga trees near Kingoonyah, SA.

SPECIMENS. Holotype ♂ SAM. A-378 4♂ ANC. A-382 1♂ U.M. A-638 1♂ ANC. WESTERN AUSTRALIA: 28.41S 121.03E, 3 km NNE Mt. Ross, NW of Leonora, 18 ii 1978 (Rentz, White) 1♂ ANC. 8 km S Carnamah, 17 xi 1963 (Sedlacek) 1♂ ANC. 30.54S 121.32E, 21 km SSE Kalgoorlie, 17 ii 1978 (Rentz, White) 2♀ ANC. 32.25S 123.35E, 8 km SSW Balladonia Motel, 13 ii 1978 (Rentz, White) 1♀ ANC.

LISTENING RECORDS. A-381, A-390, A-391, A-392.

Myara yurgama n. sp., Figs. 216B, 217G, 218K

RANGE. Central QLD.

RECOGNITION. Males: Most similar to *M. pakaria*, having dark reddish cast. Differing from *M. pakaria* in following respects: Face uniformly very

	p/s	p/ch	ch/s	kps	°C
A-378	50.8	19–20	1.05	4.6	32
A-378	49.2	21	1.05	4.7	32
A-638	44.0	25	0.83	4.5	28
?A-196	57	17–19	1.67	6.2	26
?A-196	50	15–18	1.58	6.3	26

dark (in *M. pakaria* contrastingly marked). Region beneath eyes uniformly dark (in *M. pakaria* with pale areas). Top of head with lighter area in center directly between eyes. Eyes with dorso-ventral stripes. Maxillary palpi almost completely pale (in *M. pakaria* with dark streaks). Pronotum dark reddish brown and lacking the blotchy character of *M. merimbula*. Hind femora black on inner face, transition from red to black very sudden. Dorsum of abdomen black, venter brown and somewhat banded in appearance. Harp with 3 veins. Mirror longer than wide. Front of mirror connected to chords by vein. Wings without pale bands along lateral margins. File with 64 (holotype) and 72 teeth. Genitalia as in Fig. 216B. Subgenital plate dark. Holotype measurements: Body length 14 mm; cercal length ca. 12 mm; FW length ca. 9 mm. Distance between antennal sockets 1.25 times basal antennal width. Head 3.6 times as wide as distance between antennal sockets. Cerci 0.86 times body length.

HOLOTYPE. ♂, A-460, 17 miles southwest of Stonehenge, QLD, 14 ii 1969, ANC.

SONG. Fig. 215. Group of chirps (5–12 chirps/group), each chirp containing 4–5 pulses.

	p/s	p/ch	ch/s	kps	°C
A-460	85.7	4–5	4.3	6.6	32

HABITAT. Caught by tapping tree lightly until cricket ran down trunk to where it could be reached.

SPECIMENS. Holotype ♂ ANC. A-460 1♂ ANSP.

LISTENING RECORDS. A-461, A-462.

Myara merimbula n. sp., Figs. 216C, 217K, 218HS

RANGE. Type locality in central QLD.

RECOGNITION. Males: Body color dark reddish brown with black markings. Differs from above three species mainly in possessing strongly banded fore and middle femora. Top of head with clear light and dark areas (not unicolorous as in *M. sordida*, *M. muttaburra*, and *M. pakaria*). Front of face strongly spotted with numerous dots. Side of pronotum marked as in Fig. 217K. File with 80–98 teeth ($n=3$). Hind femora with numerous narrow reddish oblique bands, with row of small spots along top. Veins of tegmina very pale, membranes between veins brown. Dorsum of abdomen dark brown.

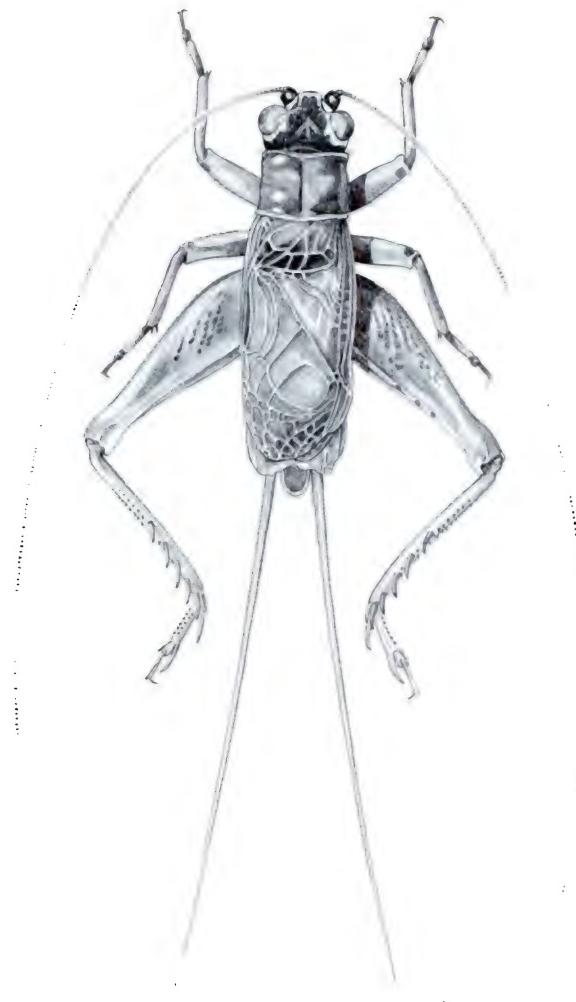


FIG. 211. *Myara pakaria*.

Venter of abdomen pale. Subgenital plate mostly pale with darker medial streak. Holotype measurements: Body length 18.5 mm; cerci broken (length of cerci paratype male 18.5 mm). File with 98 teeth.

Females: Coloration very similar to male. FW's extending to about middle of abdomen. Body length 19.5 mm; ovipositor length 18.5 mm; cercal length 20 mm.

HOLOTYPE. ♂, A-459–460, 17 miles south of Stonehenge, QLD, 14 ii 1969, ANC.

SONG. Fig. 215. One half second long chirps delivered one every 2 seconds at 33°C.

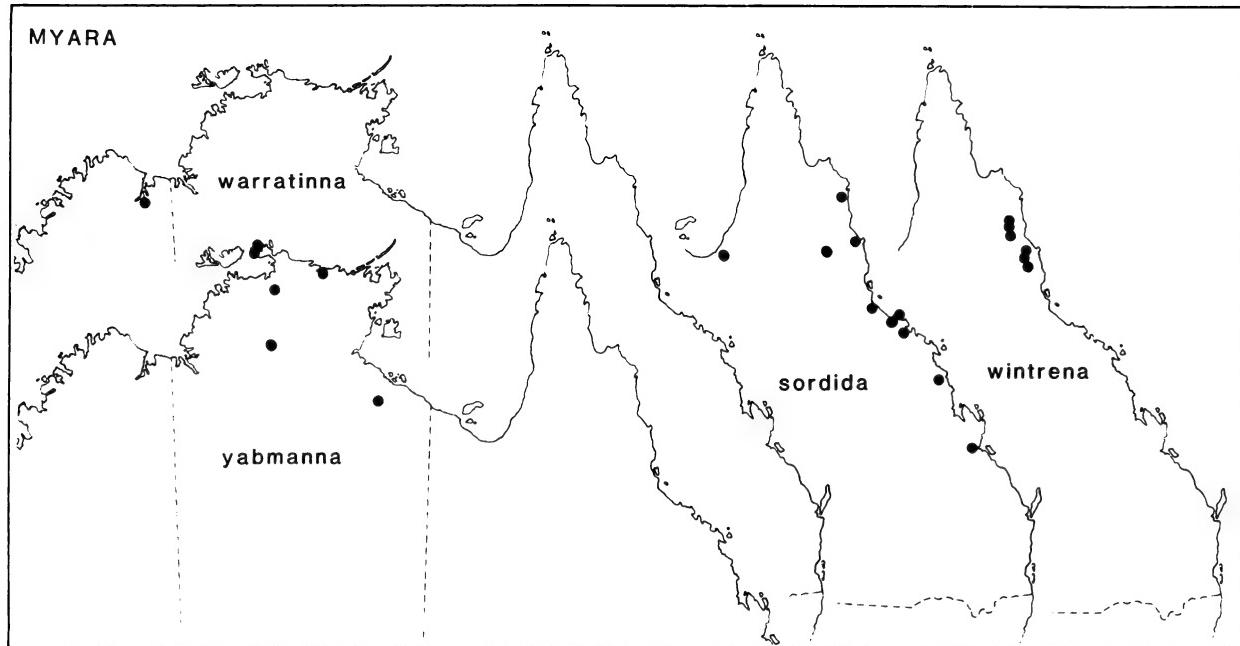


FIG. 212. Distributions of *Myara* species, Sordida Group (*erola* not included).

	p/s	p/ch	ch/s	kps	°C
A-460	65	18-19	0.5	7.0	33
A-460	67.7	29	—	7.0	33

HABITAT. Sang in sparse numbers 1-6 feet above ground in dead trees in semi-desert.

SPECIMENS. Holotype ♂ ANC. A-459-460 1♂ 1♀ ANC, 1♂ ANSP.

Myara aperta n. sp., Figs. 216D, 217M, 218LQR

RANGE. Type locality in western QLD.

RECOGNITION. Males: Most similar to *M. merimbula*. Body color reddish brown and with prominent light and dark markings on top of head and pronotum. Face yellowish but with numerous rusty spots. Top of head contrastingly marked (not unicolorous as in *M. sordida* or *M. muttaburra*). Side of pronotum quite different from *M. merimbula*—much darker than top and dark brown except for small pale spot near lower front corner. Tegmina similar to *M. merimbula*—veins distinctly lighter than surrounding membrane, but differing from *M. merimbula* in having area between subcosta and radius opaque and pale, causing formation of pale band along lateral margins of wings. Genitalia as in

Fig. 216D. Similar to *M. merimbula* in possessing striped fore- and middle-femora; markings heavier and more interconnecting in *M. aperta* than in *M. merimbula*. No vein connecting anterior part of mirror to chords unlike previous 4 species. Harp with 4 veins. Mirror longer than wide. Body length 14 mm, FW length 7.5 mm, cercal length more than 8.5 mm (broken). Distance between antennal sockets 1.07 times width of basal antennal segment. Width of head 4.6 times distance between antennal sockets. FW length 2.03 times wing width.

HOLOTYPE. ♂, A-235, 2 miles east of Mount Isa, QLD, 8 x 1968, ANC. File with 124 teeth.

SONG. Fig. 215. Series of short trills. Pulse rate seems to speed up during longer trills.

HABITAT. One male found singing in shrub growing in depression along bank of gully at sundown.

SPECIMENS. Holotype ♂ ANC.

Myara mabanuria n. sp., Figs. 217H, 218JT

RANGE. Type locality in vicinity of Meekatharra, WA.

RECOGNITION. Females: Body color dark reddish brown; palpi and lower parts of cheeks yellow. Clypeus strongly bulging and extending onto dor-

sum of head (Fig. 217H). Legs I and II reddish to black above and yellow along lower inner margin. Femur III reddish on upper and lower outer faces and black centrally (Fig. 218T). Ovipositor extremely long—about 4.5 times as long as femur III, FW's blackish but with pale veins; and some cells with central brown streak. Distance between antennal sockets 1.24 times scape width. Head about 2.73 times as wide as rostrum at front. FW 2.61 times as long as pronotum and 0.66 times as long as femur III. Femur III length 11 mm.

HOLOTYPE. ♀, 22 miles ENE of Meekatharra, WA, 29 iv 1963 (L. J. Chinnick) ANC.

SONG. Not known.

HABITAT. Not known, but probably lives on bark of trees.

SPECIMENS. Holotype ♀ ANC.

SORDIDA GROUP

The five species in this group range across the upper half of Australia. Unlike other groups both sexes have pale lateral stripes on the wings (although these are not distinct in lighter specimens); in males the FW is yellow or pale brown to tan between R and M veins; in females the FW is lighter between the Sc and R veins. Unlike the Unicolor Group the clypeus is not distinctly spotted (very finely speckled in *M. erola*, Fig. 218G) and does not extend onto the dorsum of the head. We tentatively place *M. erola* in this group, although it does not have a well defined lateral pale stripe between the Sc and R veins and the clypeus is finely speckled.

KEY TO SPECIES OF SORDIDA GROUP

1. Stripe on side of FW's (between R and M in males; between Sc and R in females) yellow. (E QLD) 2
- Stripe on side of FW's light brown or sandy colored, not yellow. (NT and WA) 3
2. Chordal area of males yellow. Face patterned more as in Fig. 218E. Ovipositor less than 1.25 times as long as femur III *wintrena*
- Chordal area of males blackish. Face patterned more as in Fig. 218B. Ovipositor more than 1.3 times as long as femur III *sordida*
3. Clypeus finely speckled (Fig. 218G). Head with pale band bordering eyes (top view). (Ovipositor ca. 2.3 times as long as femur III) *erola*
- Clypeus with broad black band at upper side. Head without pale band bordering eyes (top view). (Ovipositor of *yabmanna* 0.74–0.86 times as long as femur III; females of *warratinna* not known) 4
4. File with ca. 100 teeth. Genitalia as in Fig. 216J. Face and side of pronotum as in Figs. 217C, 218D. (NE NT) *yabmanna*
- File with ca. 135 teeth. Genitalia as in Fig. 216K. Face and side of pronotum as in Figs. 217L, 218F. (NE WA) *warratinna*

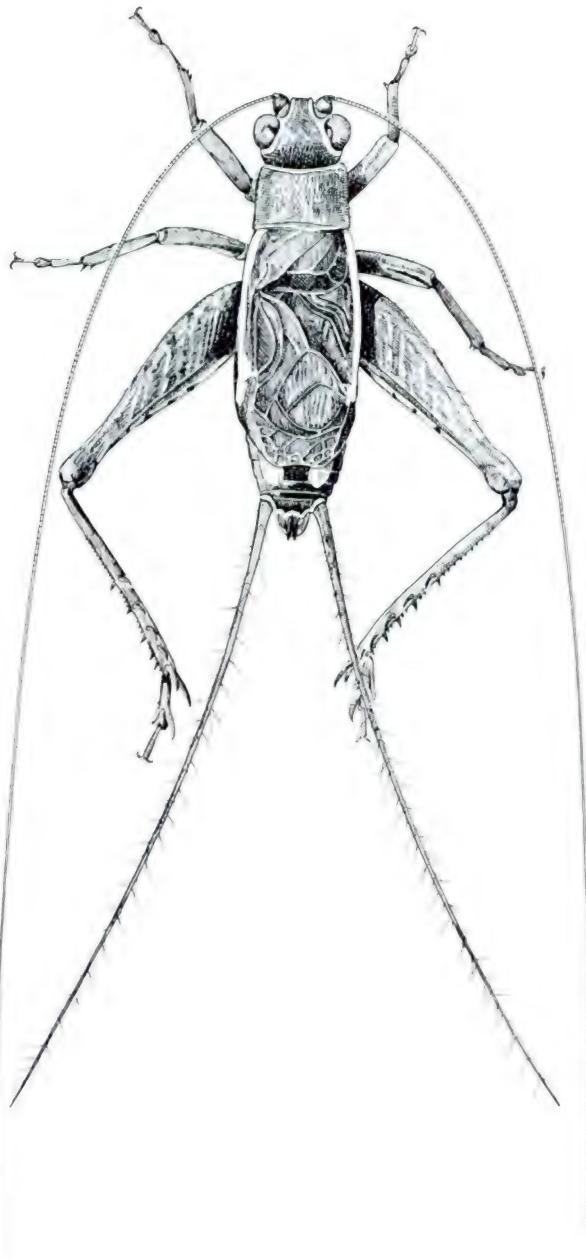


FIG. 213. *Myara sordida*.

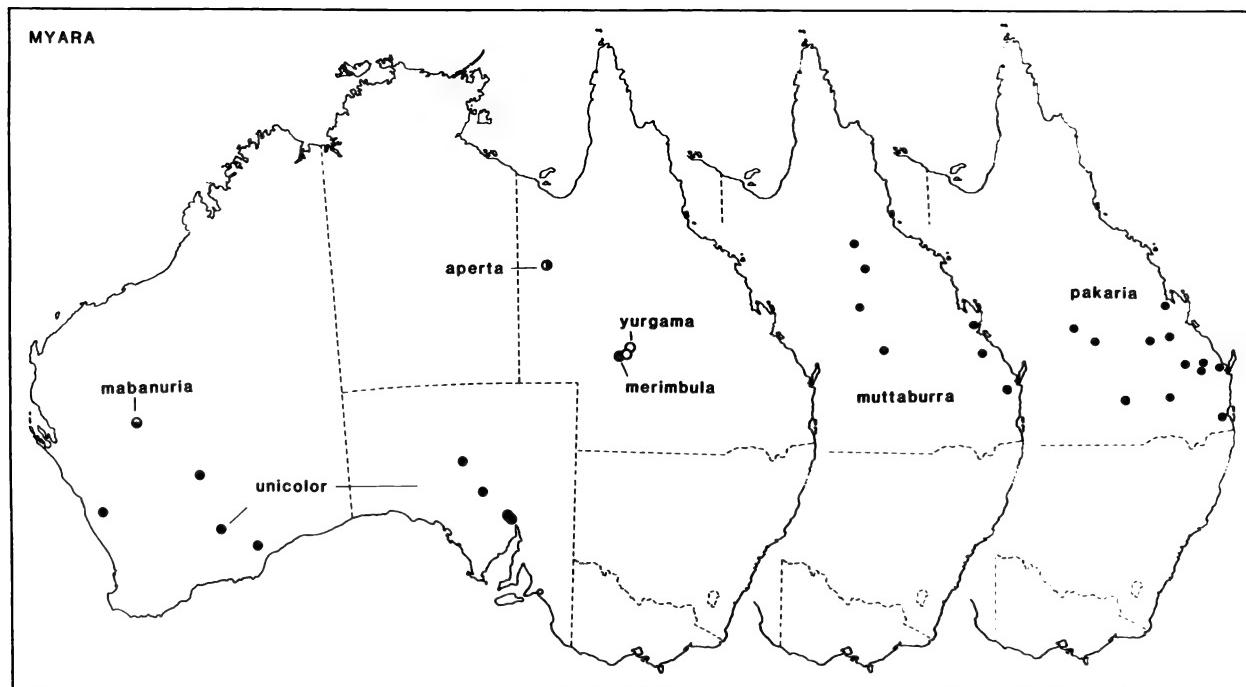


FIG. 214. Distributions of *Myara* species, Unicolor and Pakaria groups.

***Myara sordida* (Walker), Figs. 213, 216F, 217B, 218B**

Salmania sordida Walker 1869. Holotype ♂, North Australia, BM. Transferred to *Eurepa* by Chopard 1951: 485. Examined. *Piestodactylus brevipennis* Saussure 1878: 527. Synonymized by Chopard 1951.

RANGE. Northern and eastern QLD.

RECOGNITION. Males: Body color reddish-brown to black. Side of forewings, lateral lobes of pronotum, and dorsum of abdomen black. Body with pale bands running along lateral margins of dorsum, from front of pronotum to end of FW's; this band may be indistinct on pronotum. Chordal area of FW's blackish (yellow in *wintrena*). Harp with 3 or 4 veins. Venter of abdomen banded black and yellow, black at base of each sternite and yellow along posterior margin. Legs reddish brown. Number of file teeth: A-17 (136, 149 teeth), A-493 (120), A-501 (126). Mirror longer than wide and with one dividing vein with vein connecting anterior part of mirror to chords. Body length ca. 19 mm; FW length ca. 10 mm; cercal length ca. 24 mm. Distance between antennal sockets ca. 1.11 times scape width. Head width 4.4 times distance between antennal

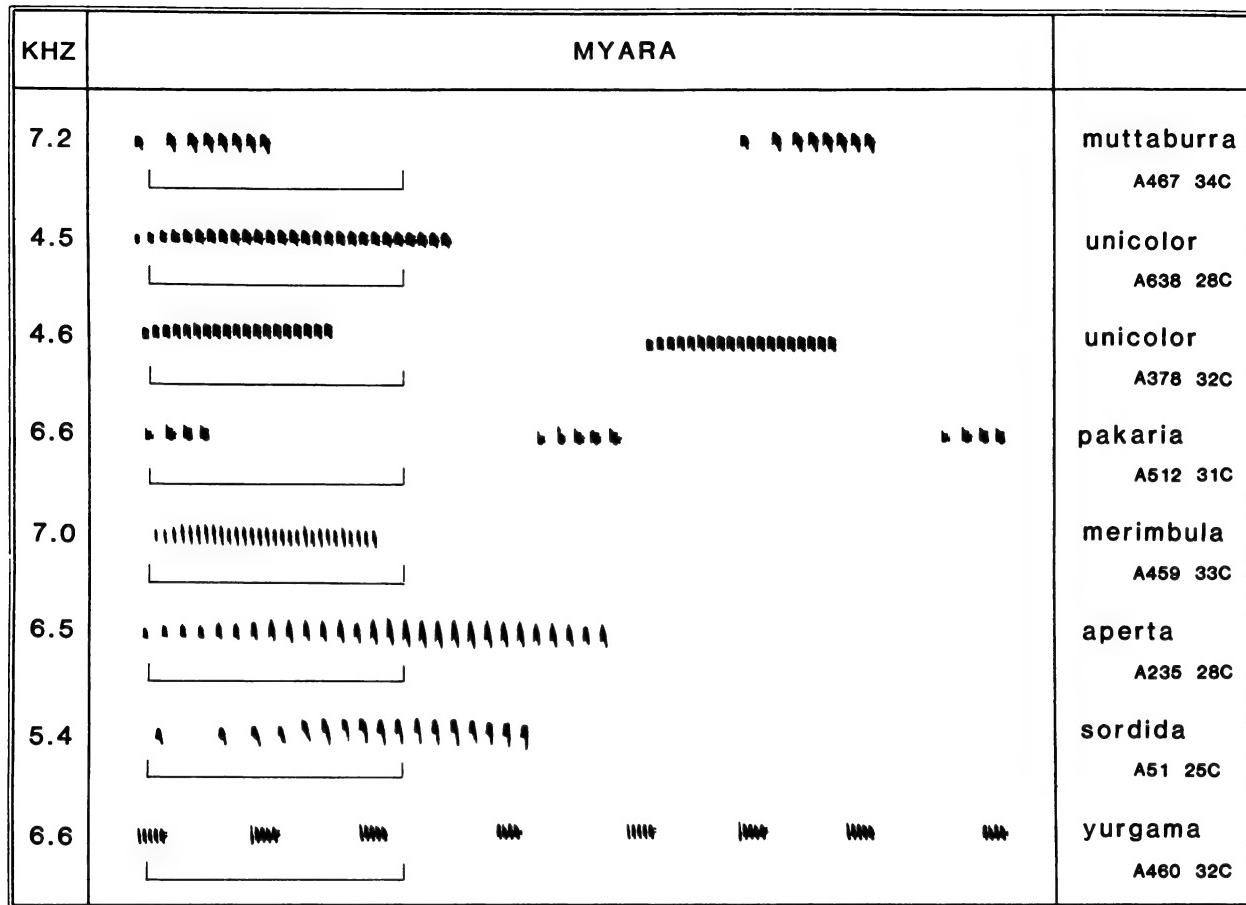
sockets. FW length 2.21 times wing width. Cercal length 1.26 times as long as body. Genitalia as in Fig. 216E. Subgenital plate black.

Females: Only studied female presumed to belong to this species is from Rockhampton, QLD. Color similar to that of males. Ovipositor 1.38 times as long as femur III. FW 0.6 times as long as femur III. FW length 7.2 mm; femur III length 12 mm; ovipositor length 16.6 mm.

SONG. Fig. 215. Succession of short trills with increasing pulse rate; heard in daytime.

	p/s	p/ch	ch/s	kps	°C
A-51	29.9	15-16	ca. 1	5.4	25
A-267	30.0	15	—	5.3	23
A-255	34.0-35.0	13-18	—	5.6-5.9	26

HABITAT. Two males collected from trees about 10 feet above ground. Males sing in relatively exposed positions, beginning in the afternoon, even in bright sunlight. They are often 10-15 feet up in a tree, either along the trunk or in a fork, and less often on herbaceous vegetation or bushes only 2-3 feet above the ground, the last particularly at night.

FIG. 215. *Myara* songs. Scale = 0.5 s.

Males disturbed physically or by bright lights usually drop immediately.

SPECIMENS. Holotype ♂ BM. A-17 1♂ ANC. A-51 4♂ ANC, 1♂ UM. A-493 1♂ ANC. A-501 2♂ ANSP. Rockhampton, QLD, Jan 1960 (Powell) 1♂ 1♀ UQC. Magnetic Isl, QLD, 8 ii 1948 (Sturgess) 1♂ UQC.

OTHER RECORDS. Chopard (1951: 485) lists the following localities for this species: QUEENSLAND: Almaden, Chillagoe District. Endeavour River. Inkerman (doubtful det.). Townsville. Magnetic Island. Kuranda. NORTHERN TERRITORY: Darwin (doubtful det.). Koolpinya (doubtful det.). SOUTH AUSTRALIA: Palmiston and Mt. Bryan (both doubtful det.).

Myara wintrena n. sp., Figs. 216H, 217A, 218EO

RANGE. Northeastern QLD, Atherton Plateau region.

RECOGNITION. Males: Body color blackish; FW's with yellowish lateral bands (region between M and R veins yellow); femur III reddish brown. Face

black and yellow (Fig. 218E). Very similar to *M. sordida* but differing as follows: Chordal area of FW's yellow (black in *M. sordida*); male genitalia as in Fig. 216H; file with 54, 55 (holotype) teeth ($n=2$) (120 or more in *M. sordida*). Harp with 3 veins. Legs I and II dark reddish brown to black. Body length 15–18 mm; femur III 10.5–13.5 mm. Cerci 17.5 mm in one male. Distance between antennal sockets about equal to scape width. FW's 3.3 times as long as pronotum and 0.71 times as long as femur III.

Females: Similar in color to males, but pale lateral wing stripes located between Sc and R veins and ending in 4th quarter of wing and where wing becomes black. HW's extending just beyond the ends of FW's.

Femur III length 12.5–13.5 mm; FW length 9–10 mm. Cerci broken in all females. Ovipositor 1.0–1.1

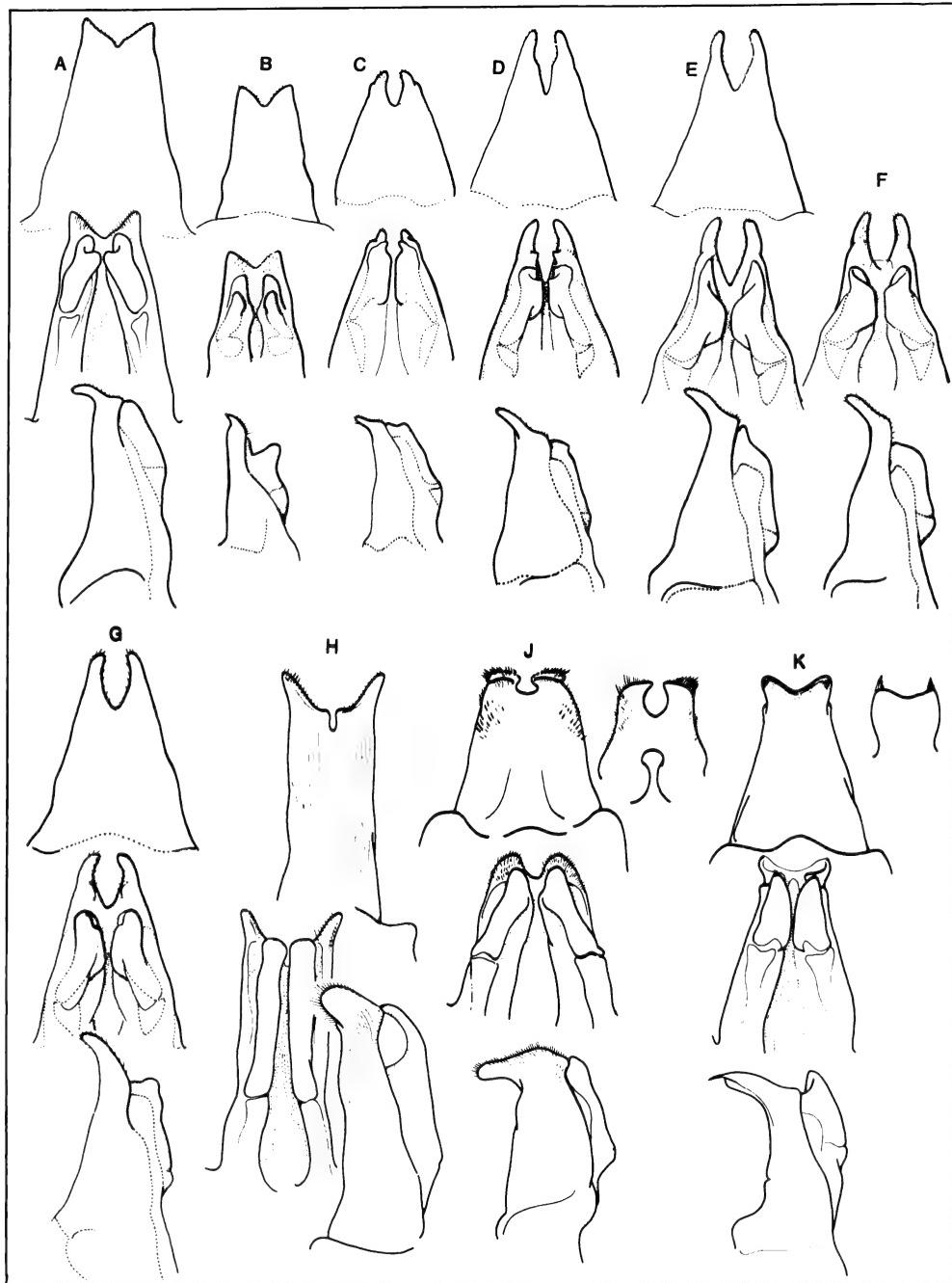


FIG. 216. Male genitalia of *Myara* species (dorsal, ventral, and lateral views vertically arranged). A, *unicolor*; B, *yurgama*; C, *merimbula*; D, *aperta*; E, *sordida* A-17; F, *sordida* A-493; G, *pakaria* A-512; H, *wintrena* Millstream Falls; J, *yabmanna* holotype; K, *warratinna* holotype.

times as long as femur III. FW 0.68–0.76 times as long as femur III.

HOLOTYPE. ♂, Mareeba, QLD, April 1944 (I.C.C.) UQC.

SONG. Not known. Low number of file teeth suggests a high pulse rate.

HABITAT. Not known, but probably in bushes and on tree trunks.

SPECIMENS. Holotype ♂ UQC. Paratypes: QUEENSLAND: 2 mi S Mareeba, 5 iii 1969 (Hubbell) 1♀ ANC. Same place 10 iii 1956 (Gressitt) 1♀ BISH. Millstream Falls, via Ravenshoe, 10 xii 1966 (B. Cantrell) 2♂ UQC. 176 km S Cooktown, 26 i 1964 (Sedlacek) 1♀ BISH. 128 mi S Cooktown, 28 i 1964 (Sedlacek) 1♂ 1♀ BISH. 96 mi S Cooktown, 28 i 1964 (Sedlacek) 1♀ BISH. Atherton, 15 iii 1963 (N. Heather) 1♀ UQC.

Myara yabmanna n. sp., Figs. 216J, 217C, 218D

RANGE. Northeastern NT.

RECOGNITION. Males: Side of pronotum and FW's black; dorsum of body distinctly lighter than sides. FW's with pale brown band along lateral margins (membrane between R and M veins pale). Legs reddish brown. Face similar to females (Fig. 218D). Dorsum of head mostly pale brown and with scattered small dark spots; occiput blackish. Dorsum of pronotum pale brown, densely covered with fine pale pubescence, and with scattered small dark spots. Genitalia as in Fig. 216J. File with 98 teeth. Body length ca. 15 mm; femur III length ca. 12 mm; FW length 8.5 mm; cercal length 17 mm. Distance between antennal sockets 0.95 times scape width. Head 4.68 times as wide as rostrum.

Females: Dorsum of body much lighter than sides. FW's dark on lateral field and brown to light brown over most of dorsal field, pale along lateral margins along Sc, R, and M veins; this pale band extends forward onto lateral lobes. Ovipositor 0.74–0.86 times as long as femur III. FW 0.66–0.77 times as long as femur III. Cerci ca. 1.75 times as long as femur III. Femur III length 13.8–15.0 mm; FW length 9.5–11.5 mm; cerci ca. 24 mm.

HOLOTYPE. ♂, 14.31S 132.22E, Tindal, NT, 1–20 xii 1967 (Vestjens) ANC.

SONG. Not known.

HABITAT. Not known, but probably on stems of shrubs and trees.

SPECIMENS. Holotype ♂ ANC. NORTHERN TERRITORY: 11.07S 132.08E, Smith Point, Cobourg Pen, 7 ii 1977 (Lewis) 1♀ ANC. 11.09S 132.09E, Black Point, Cobourg Pen, 10 i 1977 (Farlow) 1♀ ANC. 12.52S 132.50E, 15 km E Mt. Cahill, 10 iii 1973 (Key et al.) 2♀ ANC. 12.51S 132.52E, 15–22 km E Mt. Cahill, 9 iii 1973 (Key et al.) 2♀ ANC. 12.51S 132.51E, 18 km E Mt. Cahill, 8 iii 1973 (Key et al.) 1♀ ANC. 16.16S 136.05E, Caranbirini Waterhole, 33 km SW of Borroloola, 21 iv 1976 (Key et al.) 1♀ ANC. Maningrida, Arnhem Land, 20 iii 1961 (Gressitt) 2♀ BISH.

Myara warratinna n. sp., Figs. 216K, 217L, 218F

RANGE: Type locality in Wyndham, WA.

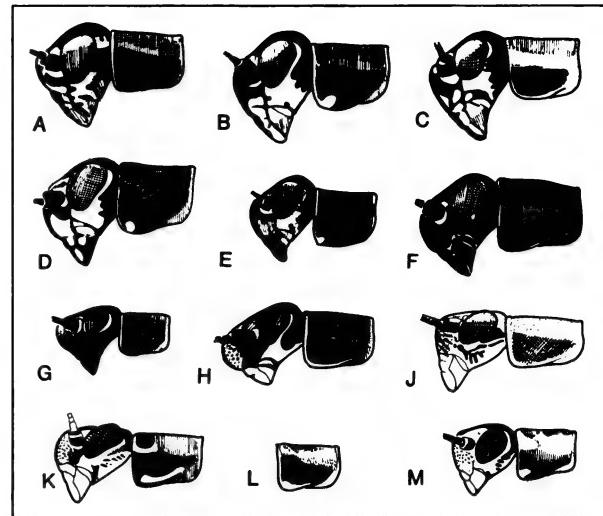


FIG. 217. Head and pronotum of *Myara* species. A, *wintrena* Mareeba QLD; B, *sordida* A-51; C, *yabmanna*; D, *pakaria*; E, *muttaburra*; F, *unicolor*; G, *yurgama*; H, *mabanuria*; J, *erola*; K, *merimbula*; L, *warratinna*; M, *aperta*.

RECOGNITION. Males: Greyish brown species with pronotum, abdomen, legs covered with dense mass of fine silvery pubescence. Genitalia as in Fig. 216K. Face and side of pronotum marked as in Figs. 217L, 218F. File with ca. 135 teeth. Harp with 4 veins. Dorsum of abdomen shiny black beneath wings; covered with silvery pubescence on last segments. Venter of abdomen pale, but segments dark at their anterior lateral corners. Distance between antennal sockets equal to scape width. Head 4.33 times as wide as front of rostrum. FW 0.86 times as long as femur III and 4.25 times as long as pronotum. Femur III length 11 mm.

HOLOTYPE. ♂, Wyndham, WA, ii 1954 (K.R.S.) ANC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC.

Myara erola n. sp., Figs. 217J, 218G

RANGE. Type locality in Crawley, WA.

RECOGNITION. Females: Holotype has reddish brown legs, pronotum, and head. FW's uniformly yellow brown. Face and side of pronotum as in Figs. 217J, 218G. Vertex of head rather flat, not

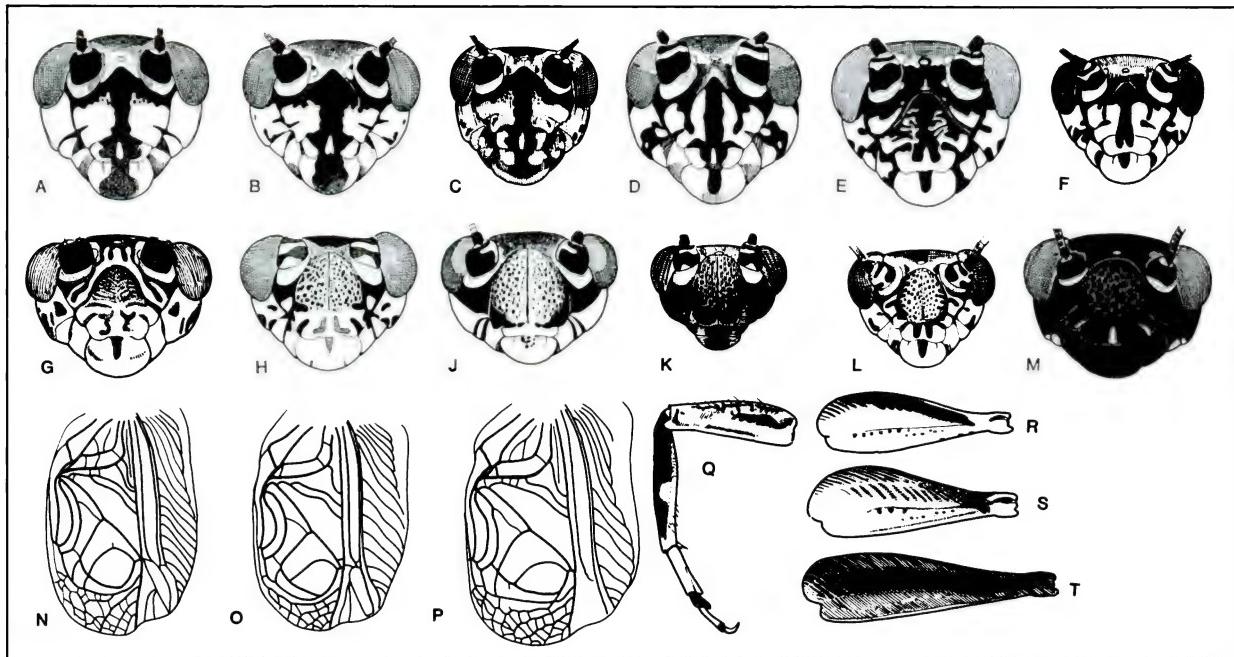


FIG. 218. *Myara*. A, *pakaria* ♀ Biggenden; B, *sordida* Rockhampton, ♀; C, *muttaburra*; D, *yabmanna*; E, *wintrena* ♀; F, *warratinna* holotype; G, *erola* holotype; H, *merimbula* holotype; J, *mabanuria* holotype; K, *yurgama* holotype; L, *aperta* holotype; M, *unicolor*; N, *pakaria*; O, *wintrena*; P, *unicolor*; Q, outer leg II of *aperta* holotype; R, *aperta* holotype outer leg II; S, *merimbula* holotype; T, *mabanuria* holotype.

concave in sagittal section at back of rostrum. Distance between antennal sockets 1.22 times scape width. Head 4.0 times as wide as rostrum. FW 2.88 times as long as pronotum and 0.72 times as long as femur III. Ovipositor ca. 2.3 times as long as femur III. Femur III length 12 mm.

HOLOTYPE. ♀, Crawley, WA, 21 xii 1934 (K. R. Norris) ANC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♀ ANC.

PAKARIA GROUP

This group of two species resembles the Unicolor Group in having a clypeus which is not spotted and which does not extend onto the dorsum of the head; but it lacks the lateral pale wing bands (between R and M veins). Both species are from Queensland.

pakaria

1. FW veins much lighter than surrounding membrane.
2. File with 124–127 teeth (n=4). Genitalia as in Fig. 216G.
3. Ovipositor 1.3–1.8 times as long as femur III (n=8).

muttaburra

1. FW veins about same color as surrounding membrane, or not strikingly lighter.
2. File with 153–171 teeth (n=6). Genitalia as in Fig. 216F.
3. Ovipositor 1.3–1.5 times as long as femur III (n=2).

Myara pakaria n. sp., Figs. 211, 216G, 217D, 218A

RANGE. Southeastern QLD.

RECOGNITION. Similar to *M. sordida* and *M. muttaburra*. Body color dark reddish brown. Similar to *M. muttaburra* in lacking white or broad pale band along lateral margin of dorsum, particularly on FW's. Mirror longer than wide. Harp with 2 veins. File with 124 teeth (n=1). Bottom of abdomen indistinctly banded (compared to *M. sordida*). Genitalia as in Fig. 216G. Holotype measurements: Body length 16 mm, FW length 8 mm, cercal length ca. 15 mm. Distance between antennal sockets 1.57 times width of basal antennal segment. Width of head 4.3 times distance between antennal sockets. Wing length 1.95 times wing width. Cercal length 0.94 times body width.

HOLOTYPE. ♂, A-512, 27 miles west of Bauhinia Downs, on Dawson Hwy, QLD, 22 ii 1969, ANC.

SONG. Fig. 215. Succession of 4–5 pulse chirps with slight acceleration within each chirp.

	p/s	p/ch	ch/s	kps	°C
A-512	30	4–5	1.3–2.0	6.6	31

HABITAT. Single male heard and captured near mid-afternoon singing in brush pile along brigalow stand.

SPECIMENS. Holotype ♂ ANC. QUEENSLAND: Pine Creek, 19 km S Bundaberg, 11 xii 1975 (Frauca) 1♂ 1♀ ANC. Bluff Range, ca. 8 km S Biggenden, xii 1970, xii 1971 (Frauca) 5♂ 5♀ 3♂ ANC. Miles, 16 i 1972 (B. Cantrell) 1♀ uQC. Woowoonga, ca. 10 km NE Biggenden, ii–iii 1971 (Frauca) 1♀ ANC. 63 mi N Marlborough, 9 v 1955 (Norris) 2♀ ANC. 11 mi SE Springsure, 17 i 1969 (White et al.) 1♀ ANC. Brisbane, 10 x 1962 (Cunningham) 1♀ uQC. Carnarvon Gorge, 30 i 1962 (Exley) 2♀ uQC. 23.43S 145.17E, 17 km S Barcaldine, 6 x 1977 (Rentz, White) 1♂ ANC. 24.18S 146.23E, 9 km SW by W Cheshire HS, nr Tambo, 29 ix 1977 (Rentz, White) 1♀ ANC. Eidsvold (Bancroft) 1♂ ANC.

LISTENING RECORDS. A-513.

Myara muttaburra n. sp., Figs. 217E, 218C

RANGE. Central and eastern QLD.

RECOGNITION. Males: Body color reddish brown. Head dark reddish brown above, but with pale line bordering eyes. Pronotum more or less uniformly rusty-brown and not banded as in *M. sordida*. FW's without striking black and white banding as in *M. sordida*. Region between subcosta and radius with reddish brown pigmentation (white in *M. sordida*). Mirror length about equal to mirror width. Vein connecting anterior part of mirror to chords. Harp with 3 or 4 veins. Hind femora reddish. Dorsum of abdomen black. Subgenital plate pale or dark brown (black in *M. sordida*). Bottom of abdomen yellow to grey—without striking banding of *M. sordida*. Genitalia very much like *M. sordida*. Stridulatory file with 153–171 teeth; holotype with 157 teeth. Body length 15 mm; cercal length 21 mm; tegmen length 10 mm. Distance between antennal sockets about 2 times width of basal antennal segment. Width of head about 4 times distance between antennal sockets. Cerci about 1.4 times length of body.

Females: Similar to males in color. FW 0.65, 0.67 times as long as femur III. Ovipositor 1.28, 1.52 times as long as femur III. Cerci 1.56, 2.00 times as long as femur III. Femur III's length 12.5, 11.5 mm; cerci length 19.5, 23 mm.

HOLOTYPE. ♂, A-467, 11 miles north of Muttaburra, QLD, 15 ii 1969, ANC.

SONG. Fig. 215. Succession of short trills at rate of 1 trill per second at 34°C. Each trill contained 8–10 pulses with pulse rate increasing during trill.

	p/s	p/ch	ch/s	kps	°C
A-477	35.7	9	—	5.9	28
A-467	36	8–10	1.0	7.2	34

HABITAT. Tree trunks on arid, stony hillsides.

SPECIMENS. Holotype ♂ ANC. A-467 1♂ UM. A-477 2♂ ANC. QUEENSLAND: 20.44S 145.11E, Burra, 2 x 1977 (Rentz, White) 1♂ ANC. 24.18S 146.23E, 9 km SW by W of Cheshire HS, near Tambo, 29 ix 1977 (Rentz, White) 1♂ ANC. Yeppoon, 9 i 1962 (Common) 1♀ ANC. 26.00S 153.05E, Camp Milo, Coolum Nat. Park, 16–20 x 1978 (Rentz, Balderson) 1♀ ANC.

LISTENING RECORDS. A-515.

EUREPELLA GENUS GROUP

EUREPELLA n. gen.

TYPE SPECIES. *Eurepella quarriana* n. sp.

This genus of at least 21 species was scarcely known prior to our collecting. Chopard described only one of the species. The members of the genus are grass specialists and males were usually found singing from grass stems, sometimes from the tops of spinifex clumps. Singing usually begins late in the afternoon while the males remain hidden in the grass. As darkness falls they begin to sing from exposed positions high above the ground.

RECOGNITION. Fig. 219. This genus may be separated from other members of the tribe by the following features: Mirror wider than long (in *Salmanites*, *Eurepa*, and *Myara* longer than wide). Head width less than twice as long as middle length of pronotum (in *Arilpa* more than twice as long). Head less than 3.2 times as wide as rostrum (in *Eurepa* and *Myara* usually almost twice as long). Female FW's always considerably longer than pronotum but usually not reaching much beyond middle of abdomen. Ovipositor from 0.8 to 1.2 times as long as femur III.

Quarriana Group

1. Male epiphallus with thin pale setae (Fig. 224A–K).
2. Dorsum of abdomen with distinct longitudinal dark bands or entirely pale.

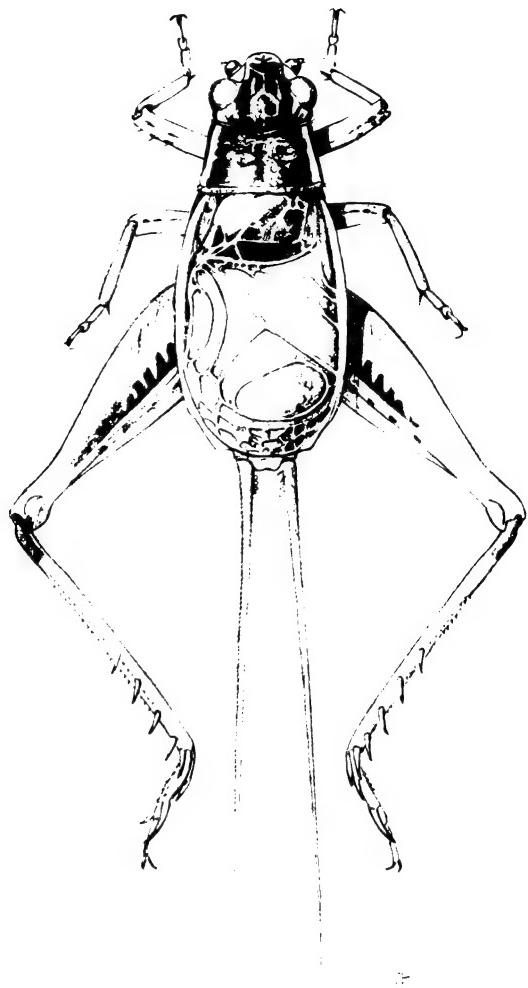


FIG. 219. *Eurepella quarriana*.

3. Legs I and II usually pale, not darkly spotted or banded (except *E. arowacka*).
4. Face pale and clypeus often spotted with brown.

Moojerra Group

1. Male epiphallus with heavy black setae (Fig. 225).
2. Dorsum of abdomen entirely dark brown or black or highly mottled with dark color.
3. Legs I and II usually with dark brown or black spots and bands.
4. Face and clypeus spotted with brown.

Budyara Group

1. Male epiphallus with thin setae, quite different from above two groups in shape (Fig. 224LM).

2. Dorsum of abdomen entirely dark brown or black, or densely mottled with dark color.
3. Legs I and II mostly black, tibiae banded.
4. Face entirely black.

NOMINA DUBIA

Eurepa subaptera Chopard 1925: 45. The holotype of this species is a female merely labelled Australia and belongs to the genus *Eurepella*. We find it impossible to relate any *Eurepella* species to this name, especially since the type locality is not known, and because the members of the genus are so similar.

Eurepa curvatifrons Chopard 1951: 488. The holotype of this species, also a female, is also merely labelled South Australia. The problems as existed for *E. subaptera* exist with respect to this name.

QUARRIANA GROUP

This group includes twelve species which are very difficult to separate using morphological characteristics, although the file count is helpful in an initial sorting. The distinctive songs and distributional information are usually necessary to separate those species with similar file. (See note, p. 282.)

RECOGNITION. This group differs from the Moojerra Group species in having distinct dorsal dark bands (either a single median band or three bands—one median and two lateral ones) and in lacking thick black setae on the epiphallus.

Eurepella quarriana n. sp., Figs. 219, 224A, 226A

RANGE. Central to southern NT.

RECOGNITION. Males: File with 201–224 teeth ($n=9$). Genitalia as in Fig. 224A. Body pale tan or cream colored on sides; light brown to reddish on dorsum of head, pronotum, and wings; dorsum of abdomen with row of dark spots or continuous dark stripe along median line and series of small spots or dark lines along margins of tergum. Face and side of head pale. Lateral lobes of pronotum largely pale. Side of thorax without dark marks. Legs I and II uniformly pale brown. Femur III somewhat reddish. Hind tibiae pale brown. FW's somewhat translucent (in alcohol), light brown. Area between chords 1A and Cu₂ milky-opaque. Mirror with complete dividing vein. Harp with 3 veins. Lateral surface of FW's with broad milky-opaque region between radius (R) and media (M). Holotype measurements: Head width 1.67 times pronotal

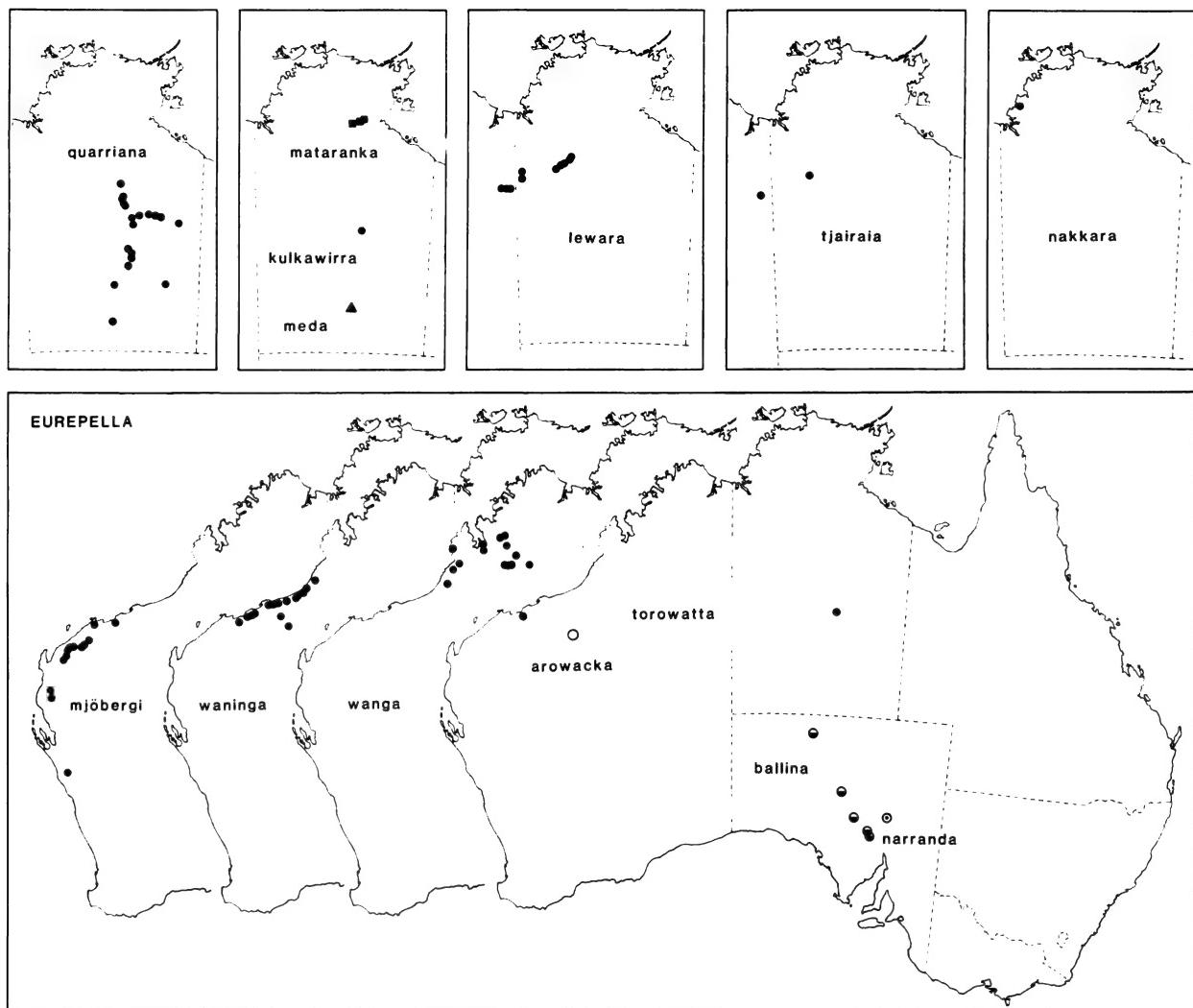


FIG. 220. Distributions of *Eurepella* species (Quarriana Group).

length and 2.69 times intersocket distance. Intersocket distance 2.36 times width of basal antennal segment. Wing length 1.52 times wing width. Cercal length 1.0 times body length. Mirror length 0.81 times mirror width. File with 209 teeth. Genitalia as in Fig. 224A. Body length 15 mm; cercal length 15 mm; femur III length 11.5 mm.

Females: Apparently entirely wingless but with small narrow wings emerging from pronotum (FW's may be broken off). Dorsum of head and thorax somewhat mottled brown. Disk of pronotum with pale lateral stripes. Dorsum of abdomen with 3 dark

stripes, one median and two lateral. Tibia III with 4 inner and 4 outer subapical spurs. Ovipositor 1.12 times as long as femur III. Ovipositor 14.5 mm long; femur III 13 mm long; cerci ca. 15 mm (tip broken).

HOLOTYPE. ♂, A-77, 24 miles S of Wauchope, NT, 18 ix 1968, ANC.

SONG. Fig. 222. Succession of chirps with pulses at two rates. From 8 to 12 shorter chirps followed by 28–40 longer chirps and then cycle repeated. Some gradualness in transition. Neighboring males seem to change more or less together, suggesting auditory influence.

TABLE 22. Comparison of species in the Quarriana Group.

Species	Range	Number of file teeth	Genitalia (Fig. 224)
<i>quarriana</i>	central NT	201-224	A
<i>mataranka</i>	northern NT	150, 169	like A
<i>wanga</i>	NNW WA	148	B
<i>waningga</i>	NW WA	173-228	C
<i>mjöbergi</i>	NW WA	180-242	D
<i>tjairaia</i>	NE WA	119	like D
<i>ballina</i>	central SA	156-187	G
<i>meda</i>	southern NT	101, 119	F
<i>nakkara</i>	NW NT	185	K
<i>arowacka</i>	NW WA	145, 152	like A
<i>kulkawirra</i>	central NT	88	E
<i>torowatta</i>	central NT to NW WA	74-90	like E
<i>lewara</i>	NE WA to W NT	217-248	J
<i>narranda</i>	SE SA	?	H

NOTE. When pulse rates in cricket songs are faster, file counts are usually lower (fewer teeth are stroked in shorter pulses). When pulse rates differ and file counts are similar (as in the species pairs *E. wanga* and *E. mataranka* and *E. tjairaia* and *E. meda*), the species with the higher pulse rate usually has the file teeth more closely spaced and a higher song frequency (kps).

	p/ch					
	p/s	ch/s	a	b	kps	°C
A-77	19.2	1.67	6	14	5.3	28
A-73	21.4	2.3	4-5	12	5.6	29
A-76	33	3.7	4	10	7.0	32
A-228	24.4	3.1	4	—	5.5	24
A-231	25	3.3	4	—	6.0	24

a, first chirps in song; b, last chirps in song.

HABITAT. Found singing on grasses in late afternoon and evening.

Males sing from perches low inside spinifex clumps during the day, but as dusk gathers they move gradually upward onto the dead sparser tall stems, until after dark they are perched more or less in the open, 2-3 feet above the ground. A male startled in any way, and even very slightly, instantly dives into the spinifex and works downward in the thick lower tangles.

SPECIMENS. Holotype ♂ ANC. A-77 1♂ UM. A-80 1♂ ANC. A-110 1♂ 1♀ ANSP. A-76 4♂ ANC. A-228 1♂ ANC. NORTHERN TERRITORY: 30 km N Wauchope, 13 x 1972 (Upton) 5♂ ANC. A-687 1♂ ANC. 22.47S 136.18E, Plenty Highway, 268 km ENE Alice Springs, NT, 14 x 1978 (Upton) 2♂ ANC. 24.15S 133.26E, James Ranges, NT, 22 ix 1978 (Rentz) 2♂ 1♀ ANC.

LISTENING RECORDS. A-77, A-78, A-79, A-81, A-96, A-97, A-98, A-102, A-103, A-105, A-106, A-110, A-228, A-229, A-230, A-232, A-233, A-234.

Eurepella wanga n. sp., Fig. 224B

RANGE. Vicinity of Broome and Derby, WA.

RECOGNITION. Males: Similar to *E. quarriana*. Pronotal disk with dark pigmentation along margin of reddish pigmented area. Lateral lobes lightly banded, bottom half pale, middle section with faint pale brown band, top with pale band. File with 148 teeth. Face with indistinct reddish spots. Dorsum of abdomen posterior to wing with single median dark band as wide as base of cerci. Beneath FW's abdomen bears three brown bands, one medially, and two laterally halfway between lateral tergal margins and median band. FW's as in *E. quarriana*. Genitalia as in Fig. 224B. Body length 15.5 mm, cercal length 16 mm.

HOLOTYPE. ♂, A-759, 357 miles northeast of Port Hedland, WA, 13 v 1969, ANC.

SONG. Fig. 222. Chirps of two lengths—short (2-4 pulse) chirps preceded by trill with about 13-23 pulses. Beginning trill occasionally not followed by chirps.

	p/ch					
	p/s	ch/s	a	b	kps	°C
A-759	26.4	3.3	24	4	5.5	20
A-850	33.6	4.3	19	4	5.0	26
A-771	24.8	5.0	13	2	5.4	23
A-772	25.0	4.6	13-17	2-3	5.4	24

a, beginning trill; b, ending chirps.

HABITAT. Grasses in open woodland.

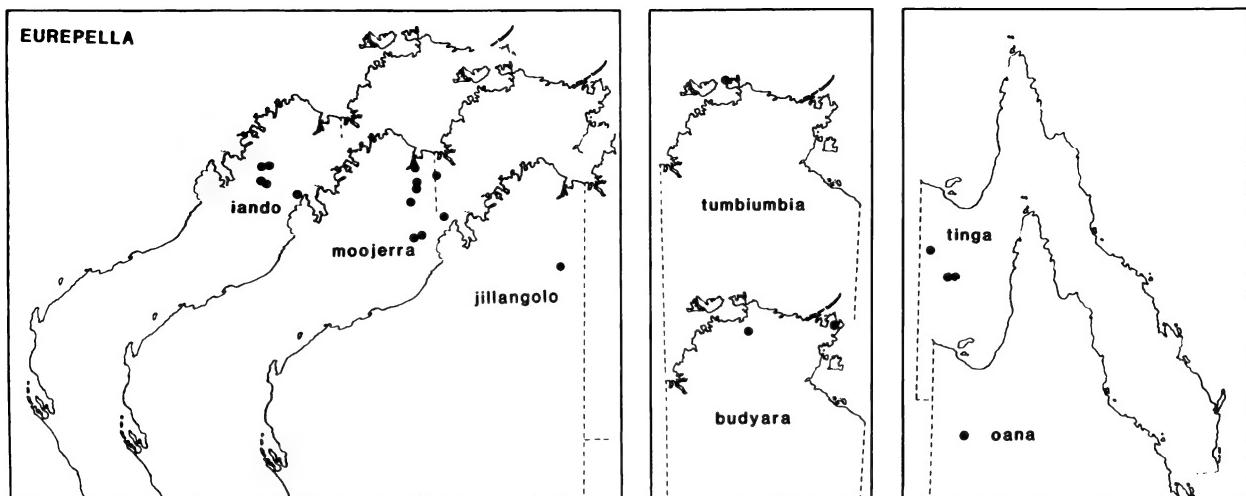
SPECIMENS. Holotype ♂ ANC. A-772 2♂ ANC. 17.19S 122.10E, 8 km S Cape Bertholet, West Kimberley dist, WA, 16 iv 1977 (Colless) 1♂ ANC. 25 mi ESE Broome, WA, 16 iv 1963 (Chinnick) 1♂ ANC.

LISTENING RECORDS. A-768, A-770, A-771, A-774, A-776, A-777, A-778, A-798, A-799, A-802, A-812, A-836, A-837, A-838, A-843, A-844, A-845, A-846, A-848, A-849, A-850, A-853, A-855, A-856.

Eurepella mataranka n. sp.

RANGE. Northern NT.

RECOGNITION. Males: Similar to *E. quarriana* in morphology and genitalia. Face above clypeus with numerous small reddish spots. Femora I and II with small brown spots. Head behind eye with reddish spots. Femur III with row of 5 spots along bottom

FIG. 221. Distributions of *Eurepella* species (Moojerra and Budyara groups).

ridge. Dorsum of abdomen with narrow stripe (in width less than thickness of tibia III). FW with marking and venation similar to *E. quarriana*. File with 150 (holotype) and 169 teeth. Holotype body length 14 mm; cerci 8 mm.

In a male from A-217 the spots on the face are not as pronounced and the tergum possesses, in addition to the median stripe, two fainter rows of spots running the length of the abdomen—one row along the lateral margin and another between this row and the median row.

HOLOTYPE. ♂, A-217, 24 miles east of Mataranka, on Roper River Road, NT, 6 x 1968, ANC.

SONG. Fig. 223. Succession of 7 to 9 pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-217	50.0	3.6	7-9	7.3	32
A-217	52.2	3.1	7-9		32

HABITAT. Grasses in open eucalyptus woodland.

SPECIMENS. Holotype ♂ ANC. A-219 1♂ ANC.

LISTENING RECORDS. A-220, A-222.

Eurepella wanina n. sp., Fig. 224C

RANGE. Between Pt. Hedland and Broome, WA.

RECOGNITION. Males: Similar to *E. wanga*. Face above clypeus slightly spotted. Femora I and II not spotted as in *E. mataranka*. Dorsum of abdomen with 3 dark longitudinal bands under the FW's and single medial band in last 5 segments. Genitalia as in Fig. 224C. File with 186–228 teeth (n=6). Files

varied as follows: A-879 (195, 228 teeth); 724 (215); 869 (204); 774 (186). Holotype measurements: Body length 13 mm; cercal length 16.5 mm. File with 217 teeth.

Females: Dorsum of body pale reddish brown. Top of head faintly banded. Disk of pronotum about same color as lateral lobes. Dorsum of abdomen with faint median band. FW's 2.5 times as long as pronotum. Ovipositor 1.21 times as long as femur III. Femur III length 12 mm; ovipositor length 14.5 mm.

HOLOTYPE. ♂, A-738, Poverty Creek, 66 miles E of Roeburne, WA, 12 v 1969, ANC.

SONG. Fig. 222. Chirps at two different rates. Longer chirps with 6 to 14 pulses at 0.83 to 2.29 chirps per second. Shorter chirps with 2 to 5 pulses at 2.1 to 4.44 chirps per second. Males found singing on tops of grass clumps.

	ch/s		p/ch		kps	°C
	p/s	a	b	a		
A-724	36.0	2.3	4.4	6	3-4	6.5
A-724	35.0	2.2	4.4	5-7	3	7.3
A-884	23.5	1.7	4.3	5	2-3	5.8
A-738	19.6	1.3	2.3	10	4-5	5.4
A-879	27.5	1.2	2.1	7-8	3-5	5.1
A-881	40.0	2.0	3.9	6-7	3	6.7
A-751	24.0	0.8	3.2	14	4	5.9

a, slower chirp rate; b, faster chirp rate.

HABITAT. Grasses in eucalyptus woodland.

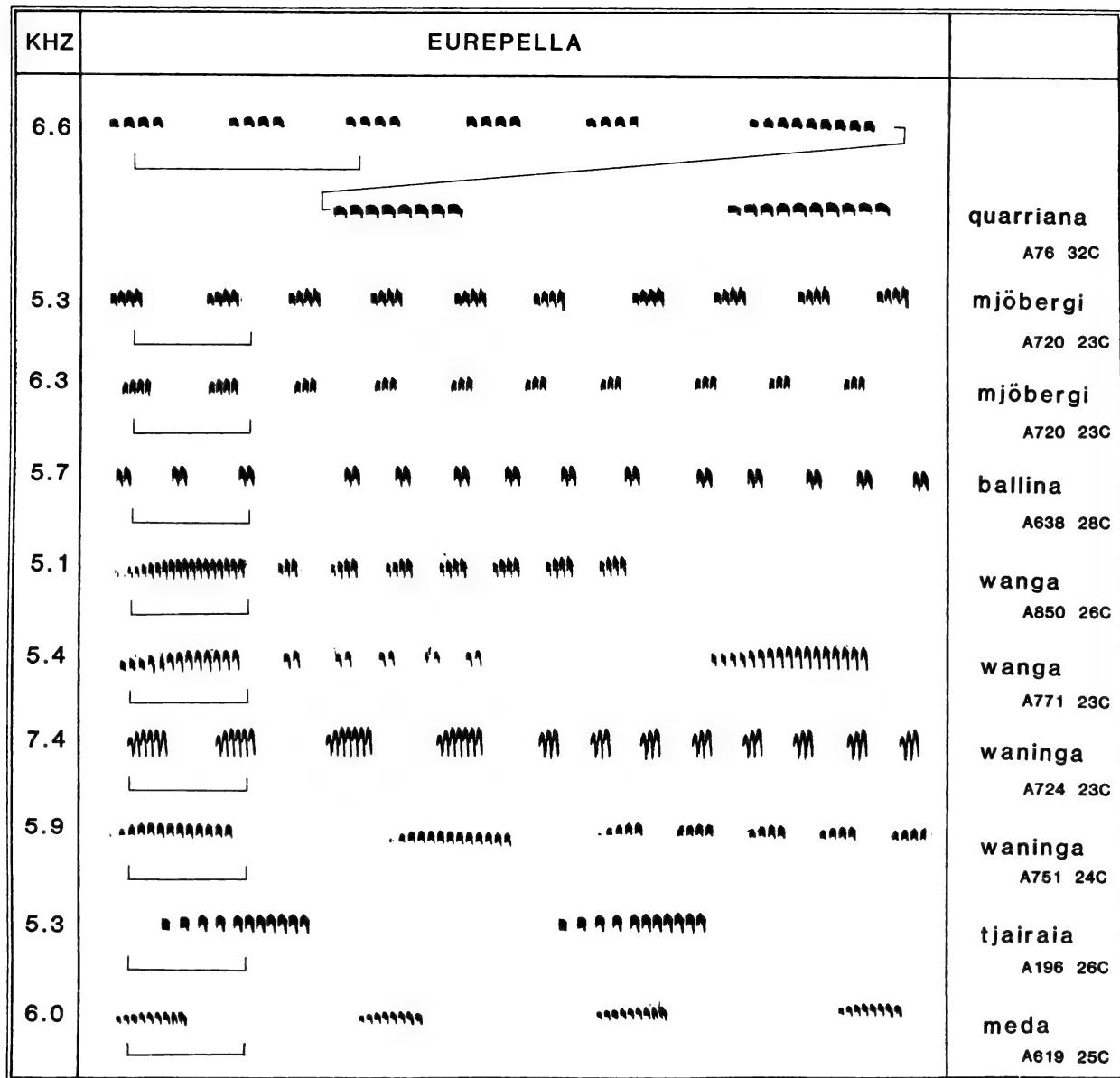


FIG. 222. *Eurepella* songs. Scale = 0.5 s.

SPECIMENS. Holotype ♂ ANC. A-724 2♂ ANC. A-738 1♀ ANC.
A-774 1♂ ANSP. A-869 1♂ UM. A-879 4♂ 2♀ ANC.

**LISTENING RECORDS. A-740, A-741, A-747, A-749, A-751,
A-752, A-754, A-755, A-758.**

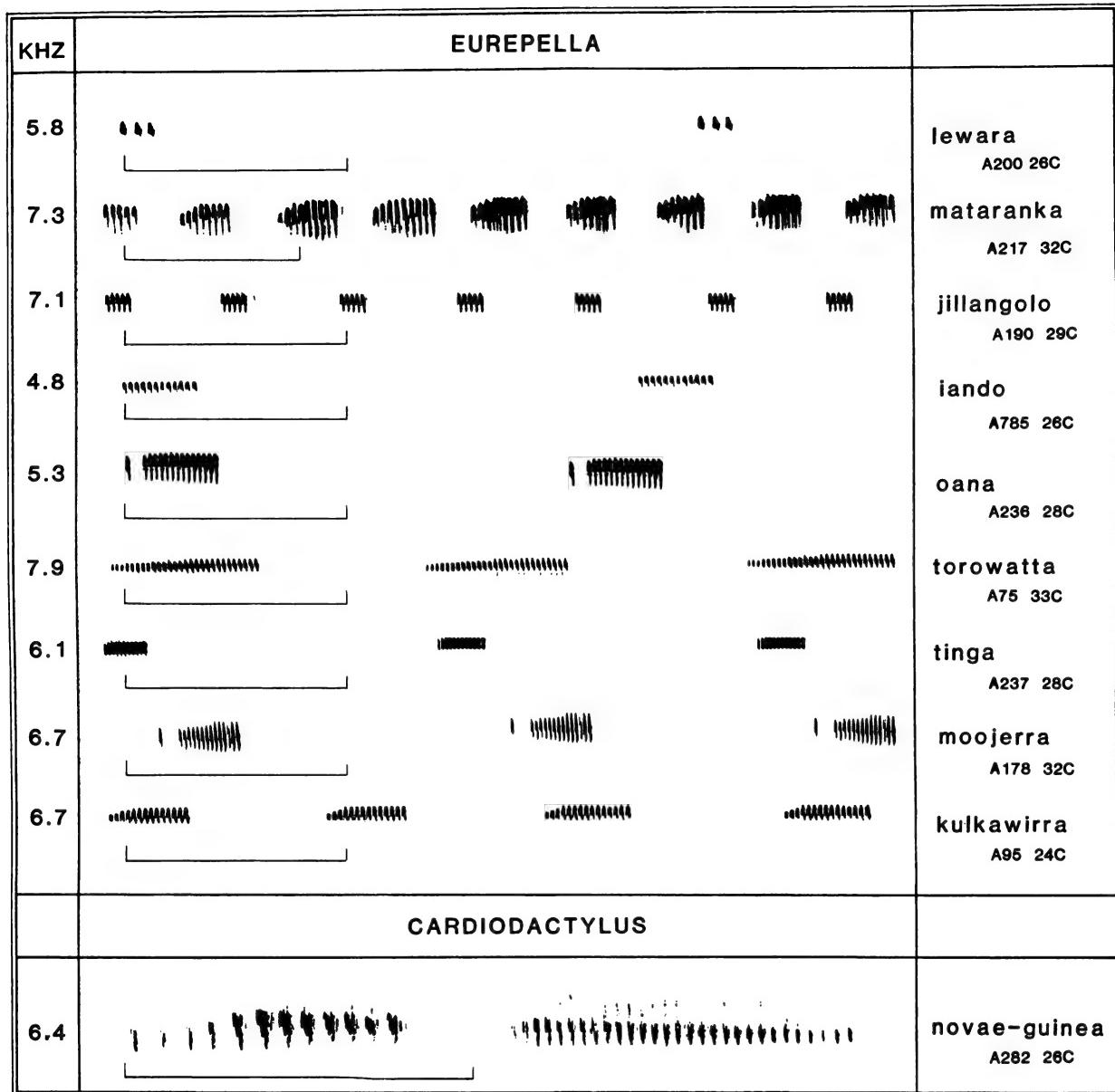
Eurepella mjöbergi (Chopard), Fig. 224D

Eurepa mjöbergi Chopard 1925: 44. Holotype ♂, Derby, WA (Mjöberg) sm. Type examined.

RANGE. Between Derby and Geraldton, WA, and NT and SA.

RECOGNITION. Males: Similar to *E. quarriana*, but side of pronotum distinctly banded. Genitalia like *E. quarriana* (Fig. 224D). Body length ca. 12.5 mm. Face and legs with spots, as in *E. mataranka* and *E. wanga*. File with 180–242 teeth ($n=11$).

Females: (A-693, A-706) Ovipositor 0.95–1.05 times as long as femur III. FW's ca. 2 times as long as pronotum. Femur III length 10, 10.5 mm; ovipositor length 9.5, 11 mm; cercal length 13+ mm (broken), 20 mm.

FIG. 223. *Eurepella* and *Cardiodactylus* songs. Scale = 0.5 s.

VARIATION. In some individuals from A-720 the abdomen has three longitudinal bands—one medial and two lateral. At A-900 the distal ends of femora I and II are darker and the first 5 abdominal tergites (hidden by the FW's) have two broad brown patches, one on either side of the median brown band. At A-706 the three abdominal dark bands are very broad, much broader than the intervening two pale

bands and all three pairs of legs are strongly pigmented. At A-736 the body is pale yellowish and the abdomen bears only a single narrow median stripe. Files varied as follows: A-720 (189, 196 teeth); 900 (242); 736 (212); 693 (180); 706 (186).

SONG. Fig. 222. Succession of 3 to 5 pulse chirps. The A-900 male may be a different species.

	p/s	ch/s	p/ch	kps	°C
A-706 n=2	20.0	1.3, 1.5	3-6	5.0	19
A-711	35.0	4.0	3-4	6.8	31
A-713	31.8	2.7	4-6	6.8	26
A-900	15.6	2.1	3	4.8	20
A-720 n=6	25-30	2.0-3.1	3-5	5.2-6.2	23
A-736	28	2.3	4-5	6.4	28
A-693	35	3.0	2-4	6.8	25

HABITAT. Found singing on grasses.

SPECIMENS. Holotype ♂ SM. A-687 1♂ UM. A-900 2♂ ANSP. WESTERN AUSTRALIA: 20.42S 116.43E, 4 km SSE Dampier, 18 x 1970 (Upton, Feehan) 1♂ ANC. 22.10S 115.02E, 20 km S Minderoo HS, 17 x 1970 (Upton, Feehan) 1♂ ANC.

LISTENING RECORDS. A-707, A-708, A-710, A-711, A-715, A-716, A-718, A-719.

Eurepella tjairaia n. sp.

RANGE. Northeastern WA.

RECOGNITION. Males: Similar to other species above. Genitalia similar to *mjöbergi*. Stridulatory file with 119 teeth. Side of pronotum distinctly banded. Dorsum of abdomen with three dark bands, one medial and two at lateral margins. Central band narrower than medial band. Body length 13 mm, cercal length more than 13 mm (tip broken).

HOLOTYPE. ♂, A-196, 72 miles east of Halls Creek, NT, 2 x 1968, ANC.

SONG. Fig. 222. Succession 7 of 11 pulse chirps; pulse rate accelerates during chirp. See note p. 282.

	p/s		p/ch	kps	°C
	a	b			
A-196 n=3	12.5-14.3	21.2-27.3	7-11	4.0-6.3	26

a, slowest pulse rate; b, fastest pulse rate.

HABITAT. Grassland with scattered trees.

SPECIMENS. Holotype ♂ ANC.

LISTENING RECORDS. A-197, A-208.

Eurepella nakkara n. sp., Fig. 224K

RANGE. Type locality in extreme northwestern WA.

RECOGNITION. Males: Overall color brown. Lateral lobes banded somewhat as in *E. mjöbergi*. Face with numerous small spots above clypeus. Tibiae

I and II with two light brown bands—one in proximal half and one in distal half; knees black. Lateral fields of FW brown below subcosta and pale again below oblique veins emerging from subcosta. Region between radius and media milky; this pale band an extension of pale band beginning behind eye. Mirror with complete dividing vein. Genitalia as in Fig. 224K. Holotype body length 16.5 mm; cercal length 16 mm; file with 185 teeth.

Females: Coloration similar to male. FW's oval, veins lighter than surrounding membrane. Dorsum of abdomen covered with fine hairs; last segments before cerci with dense mat of black hair. Cerci pale brown. Body length 18 mm. Cercal length 19 mm. Ovipositor length 16 mm. Wing length 1.19 times width of head. Ovipositor 1.1 times as long as femur III.

HOLOTYPE. ♂, 47 miles SW by W of Daly River Mission, NT, 14.13S 130.08E, 30 viii 1968 (M. Menden) ANC.

SONG. Not known.

HABITAT. Not known. Probably collected in grasslands.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♀ ANC.

Eurepella meda n. sp., Fig. 224F

RANGE. Type locality in southern NT.

RECOGNITION. Males: Differs from above species as follows: Dark band on side of pronotum not clearly defined along bottom margin. Legs I and II with narrow light brown streaks running along top and posterior surface; femur III with reddish-brown band running along top outer face; setae on legs I and II black; side of wing below subcosta suffused with brown pigmentation; dorsum of abdomen mostly dark brown to black. Dorsum of abdomen with three longitudinal dark bands distinct in distal half. Genitalia largely black (Fig. 224F). Body length ca. 15.5 mm. FW with vein connecting posterior end of diagonal vein to medial mirror vein. File with 101, 119 teeth (n=2). Paratype has dark brown tergum with scarcely visible longitudinal stripes. See note p. 282.

HOLOTYPE. ♂, A-619, Simpson's Gap, NT, 7 iv 1969, ANC.

SONG. Fig. 222. Series of chirps containing 8-9 pulses each. See note p. 282.

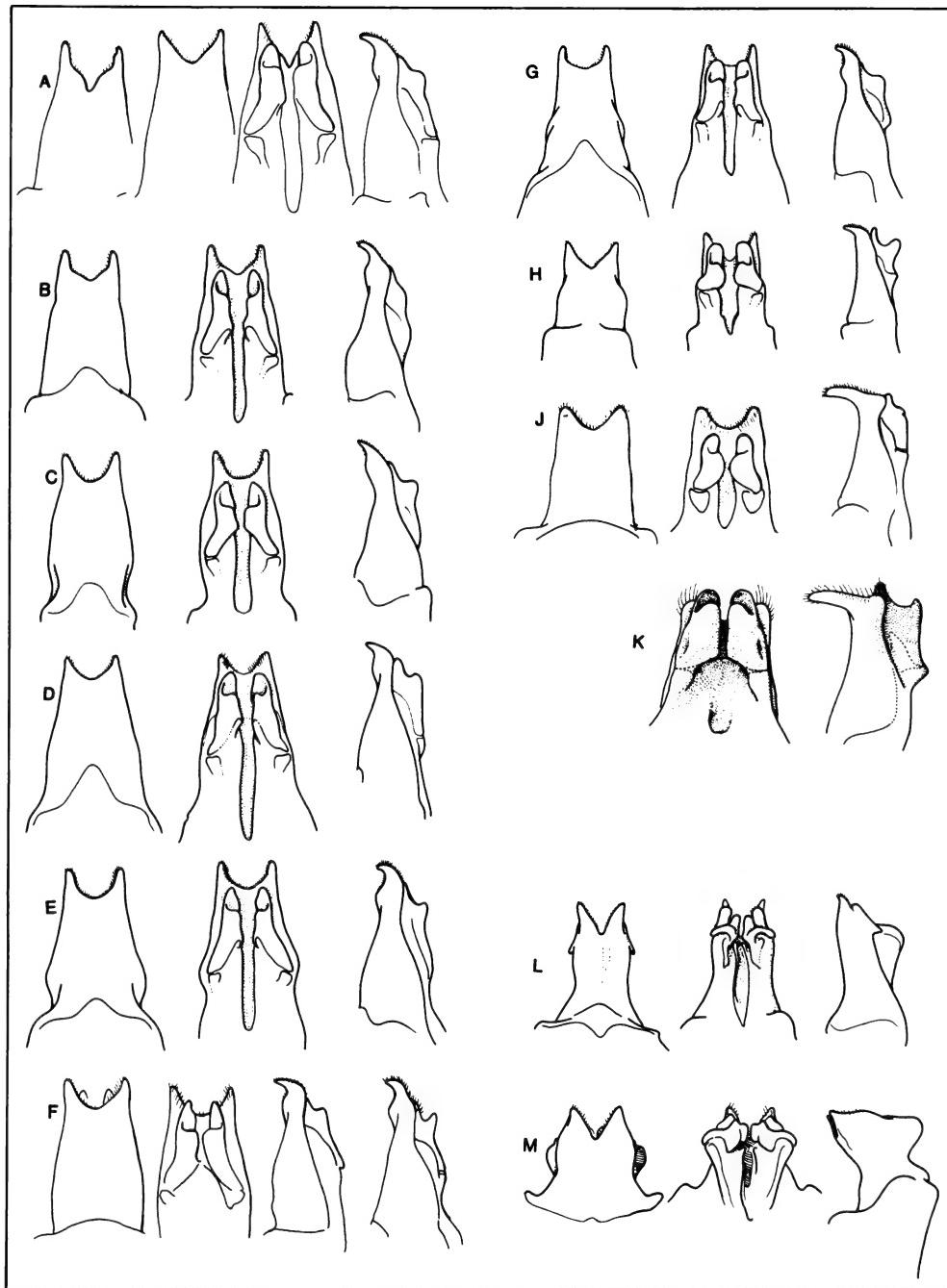


FIG. 224. Male genitalia of *Eurepella* species. A, *quarriana*; B, *wanga* holotype; C, *waninga* holotype; D, *mjöbergi* holotype; E, *kulkawirra* holotype; F, *meda*; G, *ballina* holotype; H, *narranda* holotype; J, *lewara* holotype; K, *nakkara* holotype; L, *tumbiobia* holotype; M, *budyara* holotype.

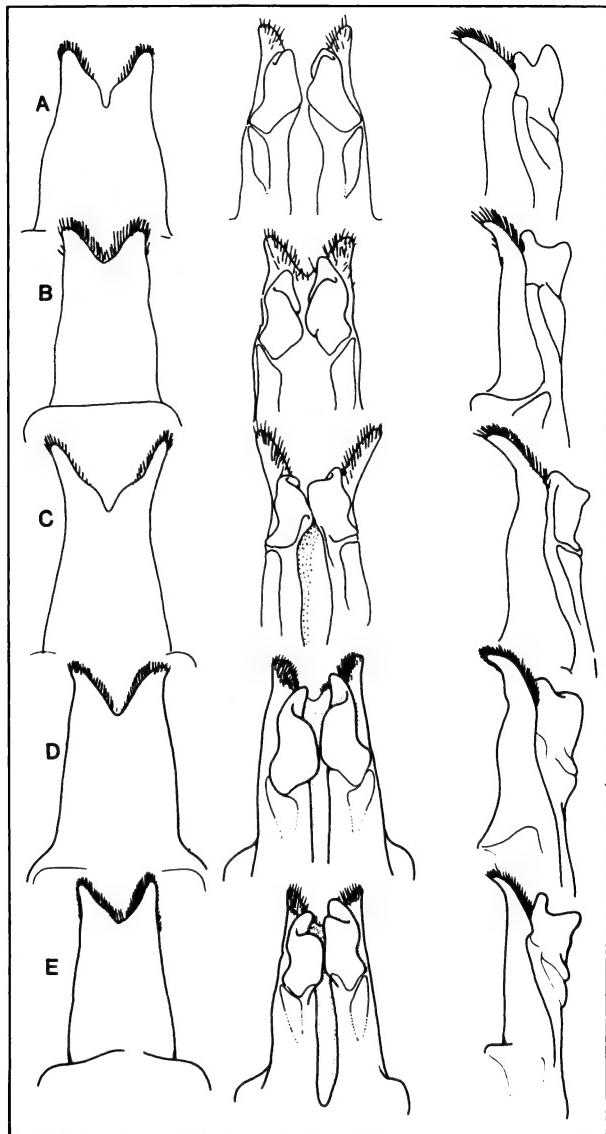


FIG. 225. Male genitalia of *Eurepella* species. A, *oana*; B, *moojerra*; C, *tinga*; D, *jillangolo* holotype; E, *iando* holotype.

HABITAT. Grasses on stony hillside.

SPECIMENS. Holotype ♂ ANC. A-619 1♂ ANC.

Eurepella arowacka n. sp.

RANGE. Type locality in northwestern WA.

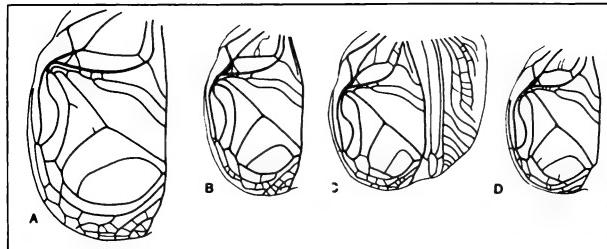


FIG. 226. *Eurepella*. A, *quarriana*; B, *tinga*; C, *tumbiumbia*; D, *budyara*.

RECOGNITION. Males: Top of head with four broad dark brown longitudinal bands between eyes. Narrow median line running down face to clypeus. Side of pronotum somewhat as in *E. torowatta* and *E. kulkawirra*. Femur I somewhat as in *E. moojerra* but cross-banding on tibia not as pronounced and terminal tarsal segment pale at proximal end. Hind femur with brown band along top outer face (much as in *E. jillangola*). Tibia III dark but not as distinctly banded as in *E. jillangola*. Tergum of abdomen with three broad longitudinal bands, one median band, and two lateral bands. Lateral bands lie above tergal margins. Harp with 3 veins. File with 145 (holotype), 152 teeth (n=2). Without vein connecting mirror to chord Cu₂. Genitalia like *quarriana* and *mataranka* but entirely black. Body length about 15 mm. Cercal length about 15 mm. Head width 2.67 times rostral width.

HOLOTYPE. ♂, A-890, 30 miles north of Nullagine, QLD, 20 v 1969, ANC.

SONG. We heard but did not tape trills.

HABITAT. Grasses on stony mountain slope.

SPECIMENS. Holotype ♂ ANC. A-890 1♂ ANC.

Eurepella ballina n. sp., Fig. 224G

RANGE. Central and northern SA.

RECOGNITION. Males: Smaller somewhat pale species with three longitudinal dark bands on dorsum of the abdomen. Lateral pronotal lobe with continuous light brown band along upper side of vertical surface (about as wide as tibia I). Femora I and II with light brown spots and streaks. Tibia I and II with 3 broad light brown bands encircling tibia. Femur III with reddish brown band running

	p/s	ch/s	p/ch	kps	°C
A-619	57	1.9	8-9	6.0	26

along top external surface (indistinct). Genitalia as in *E. quarriana* (Fig. 224G). Harp with 3 veins. File with 156, 180, and 187 (holotype) teeth. Body length 12.5 cm. Cerci broken but probably shorter than body. Wing with very small vein connecting front of mirror to front of chord Cu₂.

HOLOTYPE. ♂, A-639, 102 miles north of Kingoonyah, SA, 9 iv 1969, ANC.

SONG. Fig. 222. Series of two-pulse chirps.

HABITAT. Grassland with scattered small trees and shrubs.

SPECIMENS. Holotype ♂ ANC. A-379 2♂ ANSP. A-613 1♂ 1♀ ANC.

LISTENING RECORDS. A-383, A-384, A-385.

Eurepella kulkawirra n. sp., Fig. 224E

RANGE. Type locality in central NT.

RECOGNITION. Males: Similar to *E. meda* but differing as follows: Dark band on side of pronotum with distinct lower margin. Genitalia similar to Fig. 224E; file with 88 teeth. Dorsum of abdomen rusty-red and with three longitudinal dark bands. Posterior sides of femora I and II brown. Body length 13.5 mm. Cercal length 13 mm.

HOLOTYPE. ♂, A-95, Tennant Creek, NT, 21 ix 1968, ANC.

SONG. Fig. 223. Chirps containing about 15 pulses at pulse rate of 75/s at 24°C. Chirp rate about 2/s.

	p/s	ch/s	p/ch	kps	°C
A-95	75.7-76.6	1.9-2.0	14	6.6	24

HABITAT. Grassland with scattered acacia and eucalyptus trees.

SPECIMENS. Holotype ♂ ANC.

Eurepella torowatta n. sp.

RANGE. Central NT, and possibly to northwestern WA.

RECOGNITION. Males: Similar to *E. meda* and *E. kulkawirra*. File with 74-77 and 90 teeth. Genitalia as in Fig. 224E and black. Dorsum of abdomen black beneath FW's and with two broad lateral dark bands and medial band at distal end. Body length 13 mm, cerci broken. Holotype with 90 teeth.

HOLOTYPE. ♂, A-75, Devils Marbles, NT, 18 ix 1968, ANC.

SONG. Fig. 223. Succession of long chirps (or short trills).

	p/s	ch/s	p/ch	kps	°C
A-75	80.0	1.3-1.4	28-29	7.8-7.9	33
A-736	77.5	1.3	28	5.4	28

HABITAT. Grassland with scattered acacia and eucalyptus trees.

SPECIMENS. Holotype ♂ ANC. A-75 1♂ ANSP. A-736 2♂ ANC.

Eurepella lewara n. sp., Fig. 224J

RANGE. Northeastern WA to western NT.

RECOGNITION. Males: Face with narrow dark line descending midline from top of head and ending at clypeus. Distal end of last segment of maxillary palpi with oblique dark ring; other segments with one or two small dark spots. Inner face of femur I with row of small black spots along ventral ridge. Side of pronotum with broad dark band somewhat as in *E. torowatta*. Longitudinal dark bands on head also composed of numerous small dark spots. Dorsum of pronotum spotted and with two elongate (longitudinally arranged) dark bands parallel to one another along midline and reaching front of pronotum. Dorsum of abdomen with three longitudinal stripes—two broad (cercal width) bands along sides and much less intense medial band. Top outer face of femur III with brown band. Bottom ridge on outer face with 3 widely separated dark spots. Tibia I and II with heavy dark markings. Tibia III bicolored—brown along posterior (spurred) side and very dark brown along anterior side. FW's with light brown markings on membranes between veins. File with 217-248 teeth (n=3). With vein connecting anterior mirror with chord Cu₂. Genitalia as in Fig. 224J. Holotype body length 15 mm; cercal length 15 mm; file with 217 teeth.

HOLOTYPE. ♂, A-203, 17 miles north of Nicholson, WA, 2 x 1968, ANC.

SONG. Fig. 223. Succession of 3-pulse chirps, delivered irregularly at maximum rate of 1/s.

	p/s	ch/s	p/ch	kps	°C
A-196	17.0	max. 1.0	3	5.8	26

HABITAT. Desert grassland with scattered trees.

SPECIMENS. Holotype ♂ ANC. A-196 1♂ 1♀ ANC. A-197 1♂ ANSP.

LISTENING RECORDS. A-199, A-200, A-201, A-202, A-203, A-209, A-210, A-211, A-212, A-215, A-216.

Eurepella narranda n. sp., Fig. 224H

RANGE. Type locality in Ediacara, SA.

RECOGNITION. Males: Very small; about half the size of other *Eurepella* species. Genitalia as in Fig. 224H. Sc vein with only five branches in costal area. Costal area dark brown. Legs I and II pale and with dark spots and bands as in Moojerra Group. Legs III lost. Rostrum 2.2 times as wide as scape. Head 2.9 times as wide as rostrum. FW 2.86 times as long as pronotum.

HOLOTYPE. ♂, Ediacara, SA, 19 iii 1958 (Museum Expedition) ANC.

SONG. Not known.

HABITAT. Not known; probably desert grassland.

SPECIMENS. Holotype ♂ ANC.

MOOJERRA GROUP

The five species in this group have the dorsum of the abdomen dark brown to black or very strongly mottled with dark pigmentation. The male epiphallus is also different from the Quarriana Group species, possessing thick black setae. Femora I and II have distinct black spots or markings and tibiae I and II are distinctly banded.

TABLE 22.5. Comparison of Moojerra Group species.

Species	Range	Number of file teeth	Genitalia (Fig. 255)
<i>moojerra</i>	extreme NE WA	64-80	B
<i>jillangolo</i>	NE WA	91	D
<i>tinga</i>	W QLD	50-56	C
<i>oana</i>	W QLD	71, 79	A
<i>iando</i>	NE WA	81	E

Eurepella moojerra n. sp., Fig. 225B

RANGE. Eastern Kimberley region, WA.

RECOGNITION. Males: Body color reddish brown. Dorsum of abdomen unbanded, dark brown. Tibia I and II strongly banded. Side of head and pronotum banded. Femur III with reddish band (1.5 times as wide as tibia III) along top outer face. Extreme lateral margin of abdominal tergites pale. Venter of abdomen pale. FW's brown and without vein connecting either mirror or diagonal vein to chord Cu₂.

Genitalia as in Fig. 225B. File with 64-80 teeth (n=4). Male from A-174 less strikingly banded than holotype—tibial bands not as dark; top of abdomen uniformly brown and lacks longitudinal bands; cercal length 13.5 mm; body length 13.5 mm. File counts varied as follows: A-178 (65 teeth); 174 (71); 186 (64, 80). Holotype body length 14.5 mm; file with 65 teeth. Cerci broken.

HOLOTYPE. ♂, A-178, 10 miles SE Wyndham, WA, 2 x 1968, ANC.

SONG. Fig. 223. Succession of long chirps at 0.69 to 1.5 chirps/s and very fast pulse rate. First pulse in each chirp separated from rest.

	p/s	ch/s	p/ch	kps	°C
A-178	n=2	95-100	0.7, 1.4	15, 18	6.7, 6.9

HABITAT. Found in numbers on boulder-strewn hillside.

SPECIMENS. Holotype ♂ ANC. A-174 1♂ ANSP. A-186 2♂ ANC.

LISTENING RECORDS. A-181, A-183, A-190, A-195, A-203.

Eurepella jillangolo n. sp., Fig. 225D

RANGE. Type locality in Halls Creek region of northern WA.

RECOGNITION. Males: Similar to *E. moojerra*. File with 91 teeth. Body length 14.5 mm. Cercal length 13 mm. Genitalia as in Fig. 225D.

HOLOTYPE. ♂, A-190, 7 miles southeast of Halls Creek, WA, 2 x 1968, ANC.

SONG. Fig. 223. Succession of 4-7 pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-190	82-87	2.7-4.0	5-7	6.5-7.1	29

HABITAT. Found on rocks on boulder-strewn hillside.

SPECIMENS. Holotype ♂ ANC.

Eurepella iando n. sp., Fig. 225E

RANGE. Kimberley region, WA.

RECOGNITION. Males: Similar to *E. moojerra*. Hind tibiae not banded as in *E. jillangolo* and *E. oana*. Genitalia as in *E. moojerra* (Fig. 225E). Dorsum of abdomen black, but lateral margins of tergum pale. Femur III much as in *E. jillangolo*. Harp with 3 oblique veins. File with 47-81 teeth (n=3).

Body length 13.3 mm. Cerci broken. Genitalia as in Fig. 225E. Holotype with 81 teeth.

HOLOTYPE. ♂, A-785, 23 miles west of Mt. House, WA, 15 v 1969, ANC.

SONG. Fig. 223. Widely spaced chirps with about 12 pulses.

	p/s	ch/s	p/ch	kps	°C
A-785	70	ca. 1	12	4.8	26

HABITAT. Grassland with scattered trees.

SPECIMENS. Holotype ♂ ANC. 14.49S 126.49E, Carson Escarpment, Kimberley dist, WA, 15 viii 1975 (Common, Upton) 1♂ 1♀ ANC. 15.02S 126.55E, Drysdale R, Kimberley dist, WA, 8 viii 1975 (Common, Upton) 1♂ 1♀ ANC. 25 mi ESE Broome, WA, 16 iv 1963 (Chinnick) 1♀ ANC.

LISTENING RECORDS. A-791, A-800, A-801, A-802, A-817, A-818.

Eurepella tinga n. sp., Fig. 225C

RANGE. Western QLD.

RECOGNITION. Males: Similar to *E. mojerra* and *E. jillangolo*. Differs from those two species in genitalia (Fig. 225C) and number of file teeth (51, 50); hind femur not marked as in *E. jillangolo*, bottom ridge on inside of femur with widely spaced dots but large brown patches absent. Dorsum of abdomen reddish brown and speckled with darker markings. Top of head behind eye with dark patch. Harp with 4 veins. Body length 13.5 mm.

Females: Dorsum of abdomen black, but tergites with lateral pale spots and entirely pale at lateral margins. FW 1.9–2.1 times as long as pronotum and 0.37 times as long as femur III. Ovipositor ca. 1.1 times as long as femur III. Cerci ca. 1.1 times as long as femur III.

HOLOTYPE. ♂, A-237, 20 miles east of Mt. Isa, QLD, 8 x 1968, ANC.

SONG. Fig. 223. Succession of 10-pulse chirps with pulse rate of over 100 per second at 28°C.

	p/s	ch/s	p/ch	kps	°C
A-235	120	2.4	10	6.8	28
A-237	111–118	ca. 1.3	10–12	5.5–6.8	28

HABITAT. Grasses in stony hills.

SPECIMENS. Holotype ♂ ANC. Thornton River, 60 mi NE Ca-mooweal, QLD, 18 v 1972 (Monteith) 1♂ uqc.

Eurepella oana n. sp., Fig. 225A

RANGE. Type locality in western QLD.

RECOGNITION. Males: Face, legs, and pronotum with strongly contrasting black markings. Face with black lines running along sutures. Last segment of maxillary palpi with proximal and distal dark band, 4th and 3rd segments with proximal dark bands. File with 71, 79 teeth (n=2). Femora I and II with transverse black bands near distal end. Dorsum of abdomen not uniformly colored, medial dark band bordered on either side by pale band at distal end; these bands nearly equal in width and about as wide as base of cercus. Lateral face of abdominal tergites dark brown up to lateral margins. Dorsum of cerci pale brown and venter dark brown. Sternum of abdomen pale. Harp with 4 veins. Anterior mirror connected to anterior part of chord Cu₂ by vein. Holotype file with 71 teeth; body length 13 mm.

HOLOTYPE. ♂, A-236, 15 miles E of Mt. Isa, QLD, 6 x 1968, ANC.

SONG. Fig. 223. Chirps with 15 pulses; pulse and chirp rates of 64 and 1 per second, respectively, at 28°C.

	p/s	ch/s	p/ch	kps	°C
A-236	64	1	15	5.3	28

HABITAT. Rolling, grassy, stony hills.

SPECIMENS. Holotype ♂ ANC.

BUDYARA GROUP

This group includes two very similar species, both from Northern NT. The face, side of head, and lateral lobes are black. The dorsum of the head and pronotum is dark brown to dark reddish brown. The maxillary palpi are entirely white. Femora I and II are black. Tibia I and II are banded black and brown. Femur III has a broad black band along the upper outer face.

Eurepella budyara n. sp., Figs. 224M, 226D

RANGE. Extreme northern NT.

RECOGNITION. Males: Face, sides of head, and pronotum shiny black. Maxillary palpi white. Dorsum of body dark brown. Top of face with pale line running laterally through median ocellus. Lower two thirds of eyes much darker than top third. FW's dark in color except bone white M vein. File with

58 (paratype) and 70 (holotype) teeth. Abdomen black on dorsum, light brown on venter. Genitalia as in Fig. 224M. Femora I and II black. Tibia I and II black in basal half, then with pale band, dark band, and another pale band. First half of basal tarsal segment and all of segments 2 and 3 black. Femur III with broad black band along upper outer face; lower two thirds pale brown. Tibiae III medium brown. Spurs on basal tarsal segment and segments 2 and 3 black. Holotype measurements: Rostrum 3.18 times as wide as scape. Head 2.56 times as wide as rostrum. Front of pronotum 0.75 times as wide as rear. FW 2.8 times as long as pronotum and 0.56 times as long as femur III. Cerci ca. 0.7 times as long as femur III. Femur III 9.5 mm; cerci ca. 6 mm.

Females: Similar to male in color. Dorsum of abdomen dark brown. FW's very small—less than half as long as pronotum. Ovipositor 0.78 times as long as femur III. Cerci broken but probably nearly equal to ovipositor in length. Femur III length 11 mm.

HOLOTYPE. ♂, 12.50S 132.51E, 16 km E of Mt. Cahill, NT, 7 iii 1973 (Key) ANC.

SONG. Not known

HABITAT. Not known; probably savanna woodland.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♀ ANC. 12.22S 136.46E, 6 km W by N of Dhupuma Coll., near Nhulunbuy, NT, 19 v 1975 (Key et al.) 1♂ ANC.

Eurepella tumbiumbia n. sp., Figs. 224L, 226C

RANGE. Type locality in Cobourg Peninsula, NT.

RECOGNITION. Males: Almost identical to *E. budyara*, but with more file teeth (90) and with different genitalia (Fig. 224L). FW 2.67 times as long as pronotum and 0.62 times as long as femur III. Cerci broken.

Females: Very similar to male and to females of *E. budyara* in color. Ovipositor 0.8 times as long as femur III. Cerci about as long as ovipositor. Femur III length 11 mm.

HOLOTYPE. ♂, 11.07S 132.08E, Smith Point, Cobourg Peninsula, NT, 9 ii 1977 (R. C. Lewis) ANC.

SONG. Not known

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 2♀ ANC.

ARILPA n. gen.

TYPE SPECIES. *Arilpa wirilla* n. sp.

The species in this genus inhabit rocky or gravelly red soil in Western Australia. We found them in association with spinifex grass, and all were found singing on the ground at night.

RECOGNITION. Fig. 227. This genus possesses the following combination of features which separate it from other genera in the tribe of Eneopterini: Genitalia with cup-like ectoparameres (Fig. 230). Body size small (males up to 15 mm; usually near 11 mm). Dorsum of head with distinct or indistinct broad longitudinal brownish bands, separated by narrow pale bands; 4 such dark bands may be seen between eyes. Pronotum short and wide, width usually twice as great as median length; head width at least 1.75 times medial pronotal length. Rostrum from 1.8–2.8 times as wide as scape width. Mirror width equal to or greater than mirror length. FW length about 1.5 times FW width and 0.5–0.8 times femur III length. Female FW's shorter than pronotum. Ovipositor in known females about as long as femur III. Side body bears dark band from front of pronotum (sometimes from back of eye) to end of FW's. Side of FW below subcosta usually brown. Region between subcosta and radius milky-opaque. Anterior ventral corner of lateral lobes always with pale patch. Top outer face of femur III with dark brown stripe which extends length of femur.

***Arilpa wirilla* n. sp., Figs. 230D, 231FG**

RANGE. Roebourne and Onslow region of northwestern WA.

RECOGNITION. Males: Small (11 mm) reddish brown species with brown to dark brown band along side of body from front of pronotum to end of FW's; this band briefly interrupted on pronotum. Face and side of head pale-yellowish. Dorsum of head somewhat orange, with four broad longitudinal bands running from region between eyes to back of head. Pronotal disk almost unicolorous orange brown. FW's with following areas more darkly pigmented: entire lateral field below subcosta, membrane between radius (R) and media (M), and region between chords (1A and 2A). FW's with reduced apical field, two cells in thickness posterior to mirror. Mirror with complete dividing vein. Region of

TABLE 23. Comparison of *Arilpa* species.

Species	Num- ber of file teeth	Head		FW		Head with black marks behind eyes
		median	pronotal length	Femur	length median	
<i>wirilla</i>	46, 54	ca. 2.1	ca. 7.0	ca. 2.9	0.60	no
<i>gidya</i>	59, 59	ca. 2.2	ca. 7.4	ca. 4.1	0.73	no
<i>binderia</i>	64, 67	ca. 2.0	ca. 9.0	ca. 3.3	0.67	no
<i>allara</i>	75	ca. 1.8	ca. 8.0	ca. 3.1	0.62	yes
<i>panaroo</i>	60, 61	ca. 2.1	ca. 7.0	ca. 2.7	0.56	sometimes
<i>milkappa</i>	66	ca. 1.9	ca. 6.5	ca. 2.7	0.57	yes
<i>pitanae</i>	?	ca. 2.2	ca. 7.0	ca. 3.0	0.62	yes

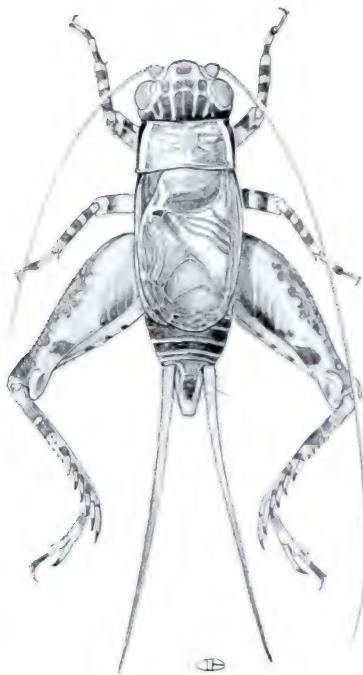
FW between subcosta and radius milky-opaque. Femur I with large brown mark on inner face near proximal end and smaller irregular mark near distal end. Tibiae I and II pale and with 3 dark bands encircling leg—two in proximal half and one in distal half. Femur III yellow-brown and with prominent dark stripe along top outer face. Inner face of femur III with irregular series of dark brown markings in middle and four small regularly spaced spots along distal half of lower ridge. Abdomen orange-brown, with laterally running line of dark markings at base of each tergite. In tergite 4 most of central region dark. Cerci shorter than hind femur. Venter of abdomen pale. Subgenital plate elongated, about as long as femur I. Body length 11 mm. Cerci 6 mm. Femur III 7 mm. Distance between antennal sockets 2.2 times width of scape. Head width 3.0 times distance between antennae and 2.06 times median length of pronotum. FW length 1.42 times FW width. Cerci 0.43 times as long as body. Mirror length 1.09 times mirror width. Harp with 3 veins. File with 54 teeth. Genitalia as in Fig. 230D.

HOLOTYPE. ♂, A-711, 22 miles southwest of Ashburton River, WA, 11 v 1969, ANC.

SONG. Fig. 229. Chirps with 6–8 pulses and rapid pulse rate. At A-797.5 we taped a song apparently belonging to this species which had 10–13 pulses.

	p/s	ch/s	p/ch	kps	°C
A-711	140	3.3	6	6.2–6.5	31

HABITAT. Open gravelly areas with scattered grass clumps.

FIG. 227. *Arilpa panaroo*.

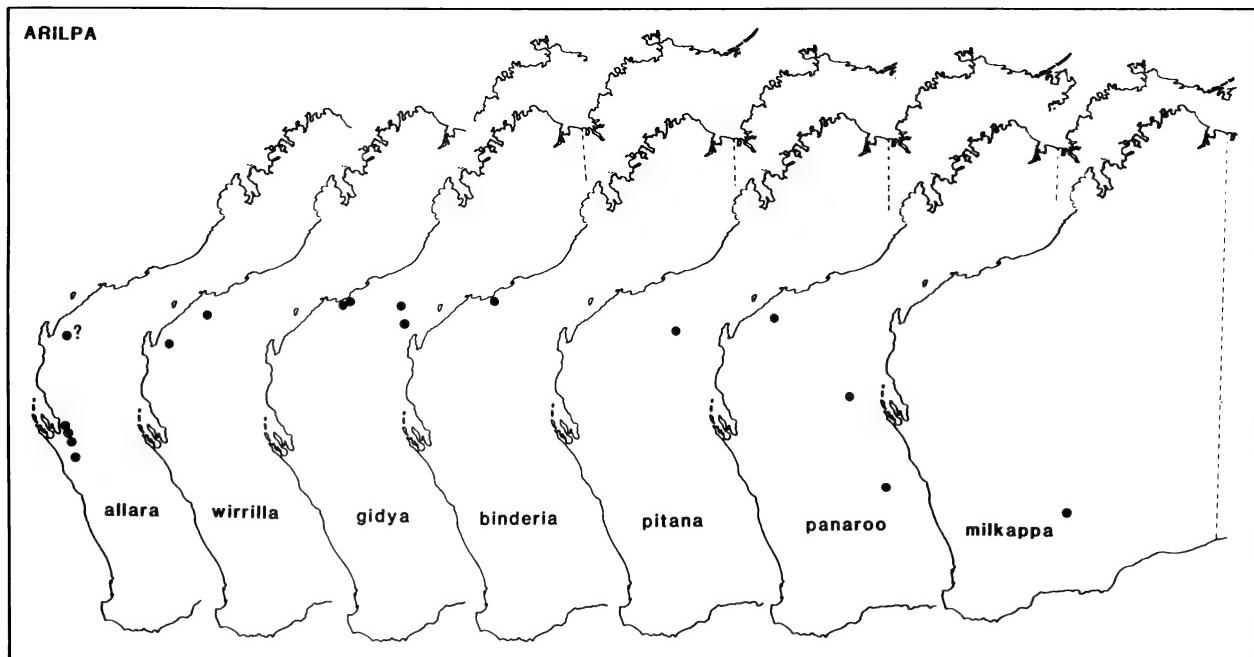
SPECIMENS. Holotype ♂ ANC. 21.35S 117.04E, 1 km N Millstream HS, WA, 9 iv 1971 (Upton, Mitchell) 1♂ ANC.

Arilpa gidya n. sp., Figs. 230C, 231C

RANGE. Roebourne and Pt Hedland region of northwestern WA.

RECOGNITION. Males: Very similar to *A. wirilla* but differing as follows: Tibiae I and II with only two dark bands, one in proximal half, other in distal half; two dark spots on femur I (inner face) more nearly equal in size; FW's longer, 2 times width of pronotum vs 1.67 times width for *A. wirilla*. Mirror with short spur entering from posterior vein. File with 59 teeth (n=2). Genitalia as in Fig. 230C. Holotype measurements: Distance between antennal sockets 2.0 times width of basal antennal segment. Head width 3.05 times distance between antennal sockets and 2.18 times medial length of pronotum. Wing length 1.56 times wing width. Cercal length 0.43 times body length. Mirror length 0.98 times mirror width. Harp with 2 veins. File with 59 teeth. Body length 11.5 mm; cerci 5.0 mm.

Females: Coloration similar to male. Dorsum of abdomen with narrow transverse dark stripes at junction of each pair of segments. FW's very small,

FIG. 228. Distributions of *Arilpa* species.

about $\frac{1}{3}$ length of femur I. Body length 12 mm. Ovipositor length 8.3 mm. Femur III length ca. 8.3 mm. Cercal length 6.5 mm.

HOLOTYPE. ♂, A-736, near Whim Creek, WA, 12 v 1969, ANC.

SONG. Fig. 229. Chirps with 24–26 pulses at rapid rate.

	p/s	ch/s	p/ch	kps	°C
A-736 n=3	70–80	1.2–1.3	22–26	5.7–6.4	28–29
A-724 n=3	75–83	1.2–1.5	24–25	6.3–6.6	23

HABITAT. Open gravelly ground with scattered bunches of grass. Found singing on ground.

SPECIMENS. Holotype ♂ ANC. A-736 1♀ ANC. A-884 1♂ ANSP.
LISTENING RECORDS. A-892.

Arilpa binderia n. sp., Fig. 231A

RANGE. Type locality in Roebourne region of northwestern WA.

RECOGNITION. Males: Very similar to *A. wirilla* and *A. gidya* but with heavier pigmentation; inside of hind femur banded; FW's uniformly light brown (less transparent than above two species); harp with 4 veins (two connecting to lateral side of stridula-

tory vein and two connecting to medial side); sides of tergites dark brown. File with 64, 67 teeth. Holotype measurements: Body length 15 mm. Cercal length 7 mm. Head width 2.0 times length of pronotum and 2.77 times distance between antennal sockets. Distance between antennal sockets 2.6 times width of scape. FW length 1.54 times wing width. Cerci 0.47 times as long as body. Mirror length 0.98 times mirror width. File with 64 teeth. Femur III length 9.0 mm.

HOLOTYPE. ♂, A-736, near Whim Creek, WA, 12 v 1969, ANC.

SONG. Fig. 229. Succession of 17–18 pulse chirps. Seen singing on ground.

	p/s	ch/s	p/ch	kps	°C
A-736	83.3	1.7	17–18	6.9	28

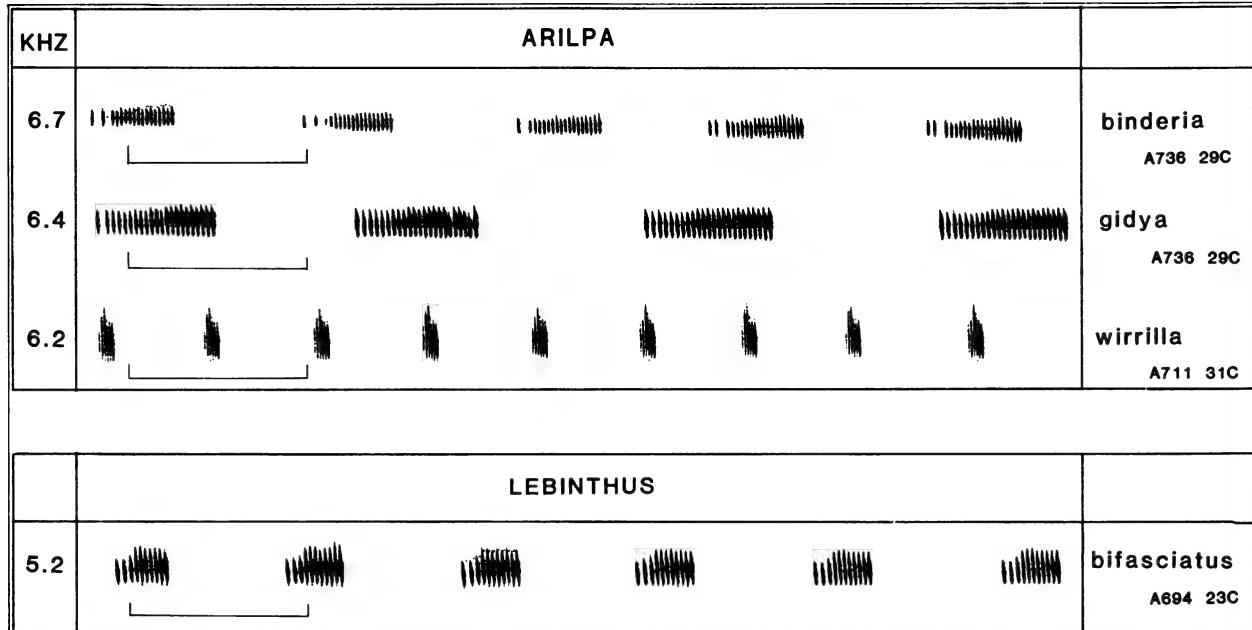
HABITAT. Open gravelly surface with scattered bunches of grass.

SPECIMENS. Holotype ♂ ANC. A-736 1♂ ANSP.

Arilpa allara n. sp., Fig. 231B

RANGE. Geraldton region of western WA.

RECOGNITION. Males: Similar to *A. wirilla*, but

FIG. 229. *Arilpa* and *Lebinthus* songs. Scale = 0.5 s.

differing in following: face with broad vertical brown band above clypeus which forks on clypeus; side of head with large brown patch behind eye; femur III with row of small brown spots along bottom ridge and another parallel row just above that; dorsum of abdomen with medial brown streak running posteriorly, three last segments with two longitudinal bands, one on either side of median line; lateral surface of each tergite mostly dark brown; harp with 3 veins; file with 75 teeth. Holotype measurements: Body length 12 mm. Cercal length 7 mm. Head width 1.78 times length of pronotum and 2.91 times distance between antennal sockets. Distance between antennal sockets 2.44 times width of basal antennal segment. Wing length 1.54 times wing width. Cerci 0.58 times as long as body. Mirror length 0.95 times mirror width.

Females: Coloration similar to male. FW's about 0.6 times as long as pronotum. Body length 14 mm. Cercal length 6.5 mm. Ovipositor length 9 mm. Ovipositor 1.06 times as long as femur III.

HOLOTYPE. ♂, A-694, 85 miles north of Geraldton, WA, 10 v 1969, ANC.

SONG. Not known.

HABITAT. Grasses in lightly wooded area.

SPECIMENS. Holotype ♂ ANC. A-694 1♀ ANC, 1♂ 1♀ ANSP.
LISTENING RECORDS. A-694, A-697, A-698, A-699, A-711?

Arilpa panaroo n. sp., Figs. 227, 230B, 231E

RANGE. Central-western WA.

RECOGNITION. Males: Reddish brown species, much darker than other *Arilpa* species; without black marks behind eyes; black band on side of body extending to back of eyes; legs banded much as in *A. wirilla*; lateral lobe of pronotum much as in *A. wirilla*; lateral surfaces of FW's dark brown below subcosta, including veins, and milky-opaque between subcosta and radius; dorsal field of FW's quite darkly pigmented and not transparent; FW's short, not reaching middle abdominal segments; dorsum of abdomen almost uniformly dark brown; dividing vein of mirror with several branches reaching anteriorly but not connecting with anterior mirror veins; file with 55, 61 teeth; harp with 3 veins; genitalia as in Fig. 230B. Holotype measurements: Body length 11.5 mm. Cerci broken. Head width 2.07 times medial pronotal length and 2.95 times distance between antennal sockets. Distance between antennal sockets 1.80 times width of scape. FW length 1.44 times width. Mirror length 0.92 times mirror width. File with 61 teeth.

Male from A-905 has somewhat different genitalia and longer wings; wings extend beyond mid-point of abdomen and dividing vein of mirror lacks anterior extending branches.

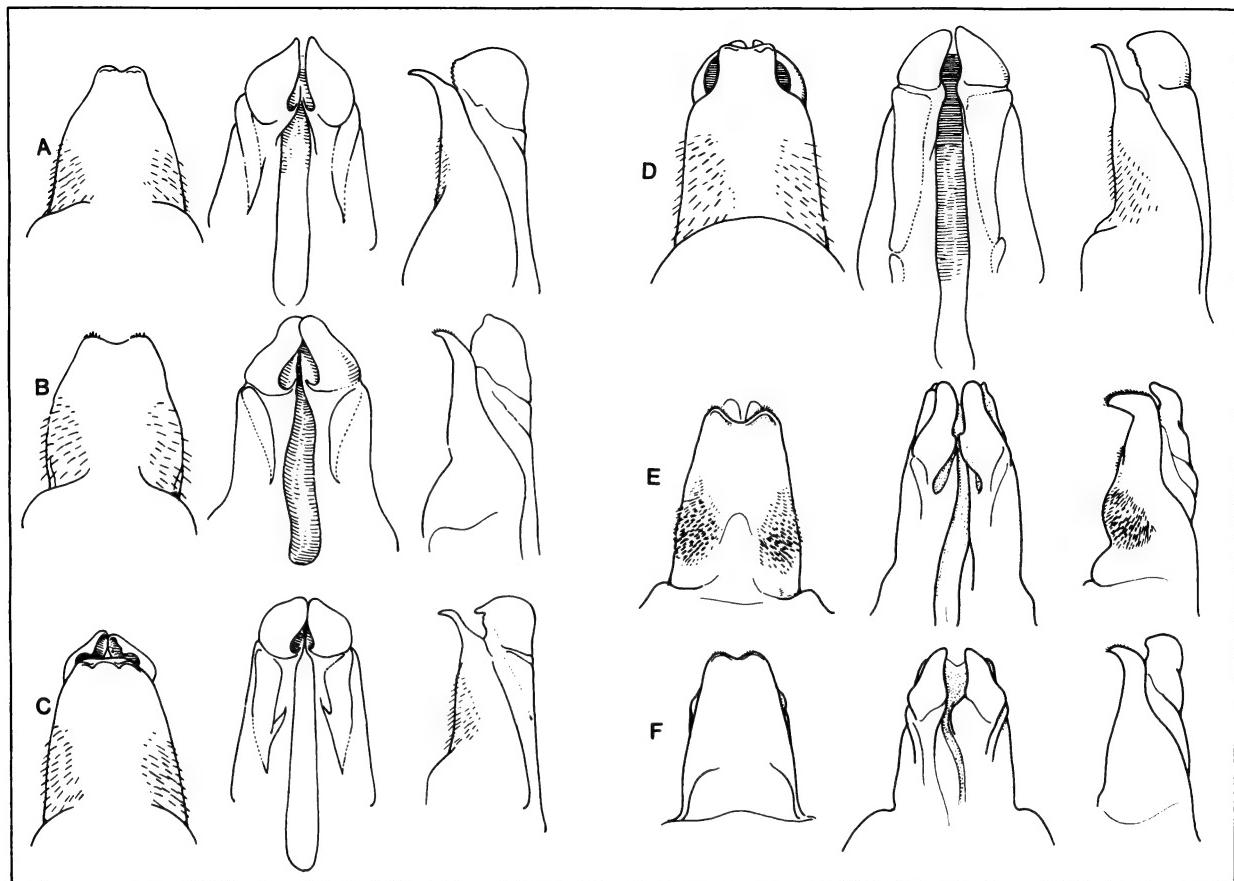


FIG. 230. Male genitalia of *Arilpa* species. A, *panaroo* A-719; B, *panaroo* A-905; C, *gidya* A-736; D, *wirilla*; E, *pitanae*; F, *milkappa*.

HOLOTYPE. ♂, A-719, ca. 133 miles SW of Roebourne, WA, 11 v 1969, ANC.

SONG. Not known.

HABITAT. Scattered grasses and acacia trees.

SPECIMENS. Holotype ♂ ANC. A-905 1♂ ANSP. 28.41S 121.03E, 3 km ENE Mt. Ross, NW of Leonora, WA, 18 ii 1978 (Rentz, White) 2♂ ANC.

Arilpa pitanae n. sp., Fig. 230E

RANGE. Type locality in Chichester Ranges, WA.

RECOGNITION. Males: Genitalia as in Fig. 230E. Face reddish brown; clypeus with blackish median stripe and bordered on each side by many dark brown spots. Dorsum of head dark reddish brown with very poorly defined longitudinal bands. Dorsum of pronotum about same color as head. Lateral lobes blackish in lower half, gradually becoming reddish dorsally. Legs I and II banded, somewhat

as in *A. milkappa*. Rostrum 2.33 times as wide as scape. Head 3.1 times as wide as rostrum. Pronotum 1.93 times as wide as long. FW 3.0 times as long as pronotum (at middle). FW 0.62 times as long as femur III.

HOLOTYPE. ♂, Narrina Pool, Chichester Ranges, WA, 11 vii 1975 (W. S. Bailey) ANC.

SONG. Not known

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC.

Arilpa milkappa n. sp., Figs. 230F, 231D

RANGE. Type locality in vicinity of Kalgoorlie, WA.

RECOGNITION. Males: Genitalia as in Fig. 230F. File with 66 teeth. Clypeus mostly dark brown but spotted on sides. Lateral lobes largely black. Dorsum of head with 6 broad longitudinal dark bands

(bands most clearly defined on occiput). Pronotal disk mostly darkly marked and speckled through central three quarters and pale along margins. FW's dark brown; venation as in Fig. 231D. Femur III darkly speckled on upper face, mostly blackish on upper outer face, and with dark oblique streaks at anterior end. Rostrum 2.75 times as wide as scape. Head 2.76 times as wide as rostrum. Pronotal width 1.87 times median pronotal length. FW 2.67 times as long as pronotum (at center). FW 0.57 times as long as femur III. Cerci broken.

HOLOTYPE. ♂, 30.31S 121.24 E, 25 km N by W of Kalgoorlie, WA, 18 ii 1978 (Rentz, White) ANC.

SONG. Not known.

HABITAT. Probably grassland with scattered trees and shrubs.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, j♂ ANC.

Genus SALMANITES Chopard

Salmanites Chopard 1951: 483. Type species: *Salmanites obscurifrons*, Chopard 1951, by monotypy.

This genus, known only from Australia, includes 13 species, all from central and northern localities. *Paraeneopterus handschini* Chopard belongs to this genus. The species was omitted from Chopard's 1951 treatment but is included in his catalogue (1968: 355). We have not seen the type, but the figure given in Chopard 1937 clearly indicates that it is a *Salmanites*. Since females of this genus are very difficult to distinguish we have included the species as a *nomen dubium*. The species all occur in open grassy country or open grassy savanna woodland. At least one species occurs along ocean beaches of Queensland. All sing mainly during the day and can usually be found on the ground, often quite exposed, or on grass very close to the ground.

The genus can be divided into several species groups and subgroups by the genitalia. However, these groups are not very clearly defined by other characters and a refinement of the classification will doubtless be necessary when the genus is more fully studied.

RECOGNITION. The members of this genus may be separated from other Australian Eneopterini by the following: Top of clypeus apparently located well below antennal sockets (Fig. 237). Rostrum

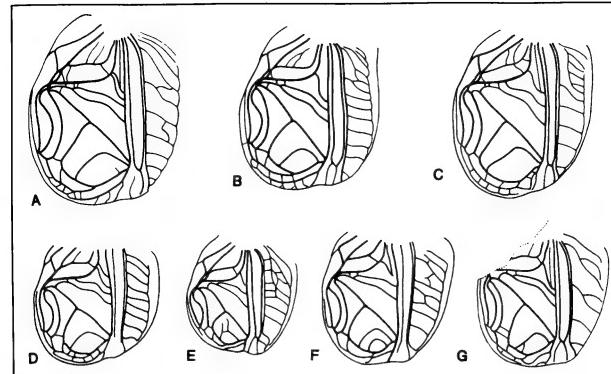


FIG. 231. *Arilpa* forewings. A, *binderia* holotype; B, *allara* holotype; C, *gidya* holotype; D, *milkappa* holotype; E, *panaroo* holotype; F, *wirrilla* near Millstream HS; G, *wirrilla* holotype.

more than twice as wide as scape (less than twice as wide in *Eurepa* and *Myara*). Mirror longer than wide. Harp with 4 or more veins. Mirror sometimes not completely divided or with only a spur protruding anteriorly from dividing vein. Females lack FW's in all species but *S. obscurifrons* and *S. iknurra*. All members of genus small with hind femur less than 9 mm long. Dorsum of abdomen has irregularly shaped 5th tergite. Dark median dorsal band begins on head (here often broken up into 3 or 4 bands) and ends on abdomen in most species. Dorsum of abdomen mostly dark in some species or with distinct median black band in others.

Wittilliko Group

1. Epiphallus with thick black dorsal setae (Fig. 236D–H).
2. Females wingless.

Peekarra Group

1. Epiphallus with thin pale dorsal setae (Fig. 236ABC).
2. Females wingless.

Ninbella Group

1. Epiphallus hairless dorsally (Fig. 236J–O).
2. Females wingless.

Iknurra Group

1. Males not known.
2. Females with small FW's.

NOMEN DUBIUM

Paraeneopterus handschini Chopard 1937: 118. Holotype ♀, Burnside, Australia (Australian gazetteer lists 4 Burnsides). Probably in Basle Museum. On the basis of Fig. 9 in Chopard 1937: 119 we believe this species belongs to the genus *Salmanites*, but we do not know which if any of the species we collected it belongs to. Since the expe-

TABLE 24. Comparison of *Salmanites* species. NOTE: Because few specimens were available for study, and because the species are so very similar to one another, and because the genus is not yet well known, this table should be used with reservations.

Species	Setae on dorsal surface of epiphallus	No. file teeth	Ovipositor length femur III length	Cercal length femur III length (♂)	Face color below median ocellus	Mirror completely divided
<i>wittilliko</i>	thick, black	65–79	?	ca. 1.5	variable (Fig. 237DE)	+ or –
<i>taltantris</i>	thick, black	80–97	ca. 1.5	ca. 1.5	mostly blackish	–
<i>noonamina</i>	thick, black	89	?	ca. 2.5	spotted	+
<i>noccundris</i>	thick, black	124	?	?	broad dark band	–
<i>peekarra</i>	thin	140–184	?	ca. 1.4	broad dark band	+
<i>terba</i>	thin	128–161	1.3–1.6	ca. 1.1	intermediate dark band	+
<i>poene</i>	thin	120–125	?	ca. 1.75	spotted	+
<i>ninbella</i>	none	85	?	ca. 2.5	spotted	–
<i>allaris</i>	none	92	ca. 1.1	ca. 1.3	intermediate dark band	+
<i>muralappi</i>	none	60	?	?	heavily spotted	+
<i>obscurifrons</i>	none	75–80	?	ca. 0.8	black	+
<i>alta</i>	none	58	1.25–1.38	ca. 2.0	dark brown	–
<i>iknurra</i>	?	?	0.90	?	mostly brown	?

dition on which this species was collected involved only northern Australia we believe the species is from the Northern Territory.

WITTILLIKO GROUP

The four species in this group have the dorsal surface of the epiphallus partly covered by a dense mat of thick black setae.

KEY TO MALES OF WITTILLIKO GROUP

- File with fewer than 100 teeth 2
- File with more than 110 teeth *noccundris*
- Face either black or with broad median band (Fig. 237A–J). Cercus less than 1.6 times as long as femur III 3
- Face spotted on clypeus. Cercus at least 2 times as long as femur III *noonamina*
- File with 65–79 teeth. Face not black under eyes (Fig. 237DE) *wittilliko*
- File with 80–97 teeth. Face dark brown or black (Fig. 237C) *taltantris*

Salmanites wittilliko n. sp., Figs. 236EF, 237DEVW, 238EGHV

RANGE. Most of NT and eastwards to central QLD.

RECOGNITION. Males: Face with central brown band narrowing ventrally and reaching center of labrum (Fig. 237DE) or largely black. Lateral lobes with irregular dark horizontal band in dorsal half or largely dark (Fig. 237VW). File with 65–79 teeth (n=6). Mirror with complete dividing vein. Harp usually with 4 veins (Fig. 238E). FW darkest along dorsolateral margin. Legs largely pale. Femora I and II with thin brown stripes on inner and outer surfaces. Femur III pale brown, with horizontal row of dark spots on inner face. Basitarsus III less than 2 times as long as second segment. Dorsum of abdomen nearly black centrally on segments 5–10, forming dark band with straight sides which narrows posteriorly. Segments 1–4 with light brown central band. Dark band on 10th tergite wider than base of cercus. Subgenital plate pale, length equal to width. Genitalia similar to Fig. 236EF. Holotype measurements: body length 11 mm; FW length 5.5 mm; femur III 7.7 mm; cerci 11.0 mm (tip broken).

Male and female from A-73 have black faces and male has stridulatory file with 66 teeth. Distal end of femur III dark brown in female; subgenital plate

has broad central dark band. Male from A-227 differs from type as follows: Anterior and posterior margins of pronotum with narrow brown line; harp with 4 complete and 2 incomplete veins, and 65 file teeth; abdominal tergites 1 and 2 as dark as posterior tergites; lateral surfaces of tergites as dark as central band. Two males from A-38 differ from holotype as follows: Files with 78 and 79 file teeth. Ventral band on face more diffuse, consisting of series of brown spots just above epistomal suture. Back of head with 6 horizontal dark lines (central two bands separated by very narrow pale line). Lateral lobes of pronotum nearly black except on ventral extremity. Mirror incompletely divided.

HOLOTYPE. ♂, A-163, 28 miles west of Katherine, NT, 29 ix 1968, ANC.

SONG. Fig. 234. Succession of rapidly delivered chirps with high pulse rate and 7–11 pulses per chirp.

	p/s	ch/s	p/ch	kps	°C
A-227	n=5	100	5.0–5.4	10–11	6.1–6.9
A-163	n=5	95–100	5.4–5.8	9–11	7.0–7.2
A-38	n=2	93, 100	5.4, 5.6	7, 8	5.7, 6.5
A-73	n=3	91–109	6.3–8.5	7–8	6.8–6.9
A-71	n=3	95–106	5.0–5.2	10–11	6.8–7.3
A-39		133	4.7	9	4.8
A-684		84	5.8	9	7.2–7.6
					34

HABITAT. Males sing only in daytime in grassy areas and leaf litter.

SPECIMENS. Holotype ♂ ANC. A-38 3♂ ANC. A-72 1♂ 1♀ ANC. A-163 7♂ ANC. A-227 1♂ ANSP. Mt. Olga, NT, ix 1948 (Bechervaise) 1♂ ANC. 23.36S 133.34E, New Well Camp, 33 km WNW Alice Springs, NT, 30 ix 1978 (Rentz) 1♂ ANC. 23.46S 133.46E, Roe Creek, 12 km SW by W Alice Springs, NT, 27 ix 1978 (Rentz) 1♂ ANC.

LISTENING RECORDS. A-86, A-201.

Salmanites taltantris n. sp., Figs. 235, 236D, 237CT, 238NWX

RANGE. Western QLD to northeastern WA.

RECOGNITION. Males: Dorsum of head with 4 dark longitudinal lines (sometimes indistinct) becoming darker between eyes (Figs. 235, 237C). Face mostly black. Pronotal disk mostly yellow-brown. Lateral lobes black except extreme ventral edge pale (Fig. 237T). Mirror partially divided by vein intruding from posterior end (Fig. 238N). File of holotype with 80 file teeth. Male from Horn Islet has 97 teeth. Fourth tergite of abdomen mostly pale

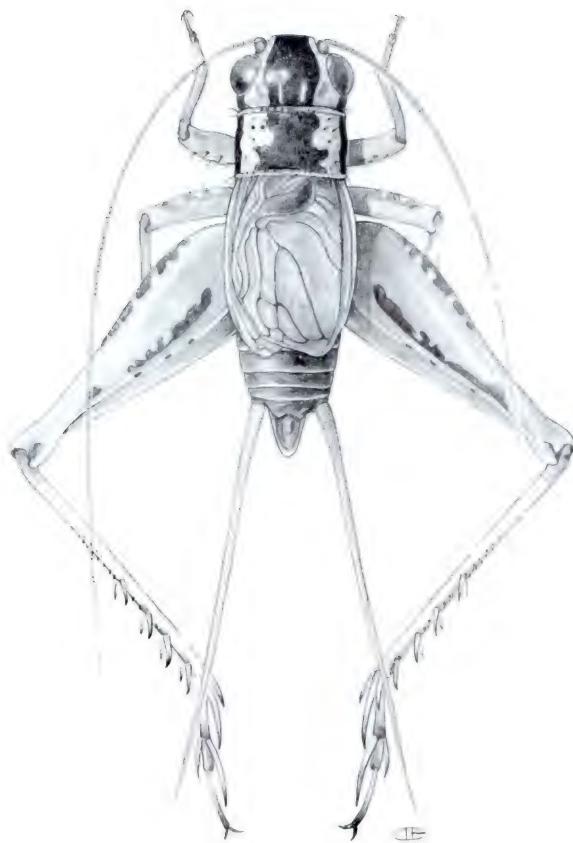


FIG. 232. *Salmanites alta*.

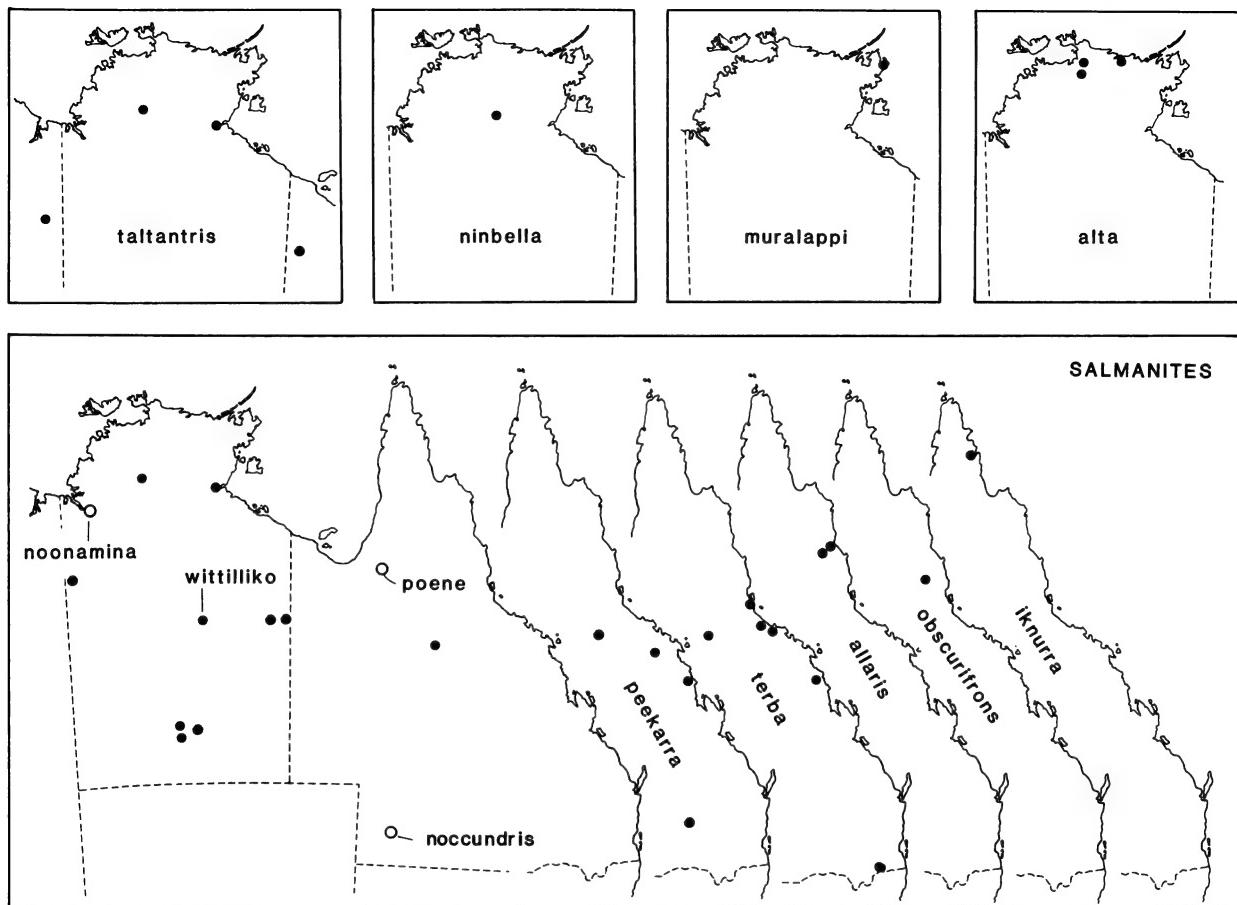
in holotype. Legs I and II pale yellow with small black spots at base of setae. Basal tarsal segments of leg III less than twice as long as middle segment. Holotype measurements: Body length 10.7 mm; FW length 5.3 mm; femur III length 7.6 mm; cerci 11.4 mm.

Females: Head similar to holotype. Lateral lobes of pronotum mostly black except ventral tip. Posterior margin of subgenital plate straight or very slightly convex. Ovipositor length 9.6 mm. Femur III length 6.4 mm; cercal length 8.0 mm.

HOLOTYPE. ♂, A-227, Roper Bar, NT, 5 x 1968, ANC.

SONG. Fig. 234. Succession of 3-pulse chirps at 11–14/s.

	p/s	ch/s	p/ch	kps	°C
A-227	n=7	76–87	11–13.8	3	6.0–6.8
A-163		83	14	3	6.9
A-196		83	13	3	6.8
					26

FIG. 233. *Salmanites* distributions.

HABITAT. Males sang in short grass and leaf litter under a large tree.

SPECIMENS. Holotype ♂ ANC. A-227 3♂ 3♀ ANC. A-163 1♂ ANSP. QUEENSLAND: Thornton R, 60 mi NE Camooweal, 18 v 1972 (Monteith) UQC. NORTHERN TERRITORY: Horn Islet, Sir Edward Pellew Group, 1-7 ii 1968 (Cantrell) 2♂ 2♀ UQC.

Salmanites noonamina n. sp., Figs. 237LX, 238D

RANGE. Type locality along lower Victoria River, NT.

RECOGNITION. Males: Similar to *S. wittilliko* but differing in following characters: Face with very narrow central line, with numerous small brown spots on either side; harp with 5 veins, one not connected to stridulatory vein; file with 89 teeth; tergites 1, 2, and 3 of abdomen dark brown. Body length 10.4 mm; FW length 4.4 mm; cerci broken but probably at least 2 times body length.

HOLOTYPE. ♂, A-169, West Baines River, NT, 30 ix 1968, ANC.

SONG. Fig. 234. Succession of 12-14 pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-169 n=3	56-63	2.8-3.4	12-14	7.0	32

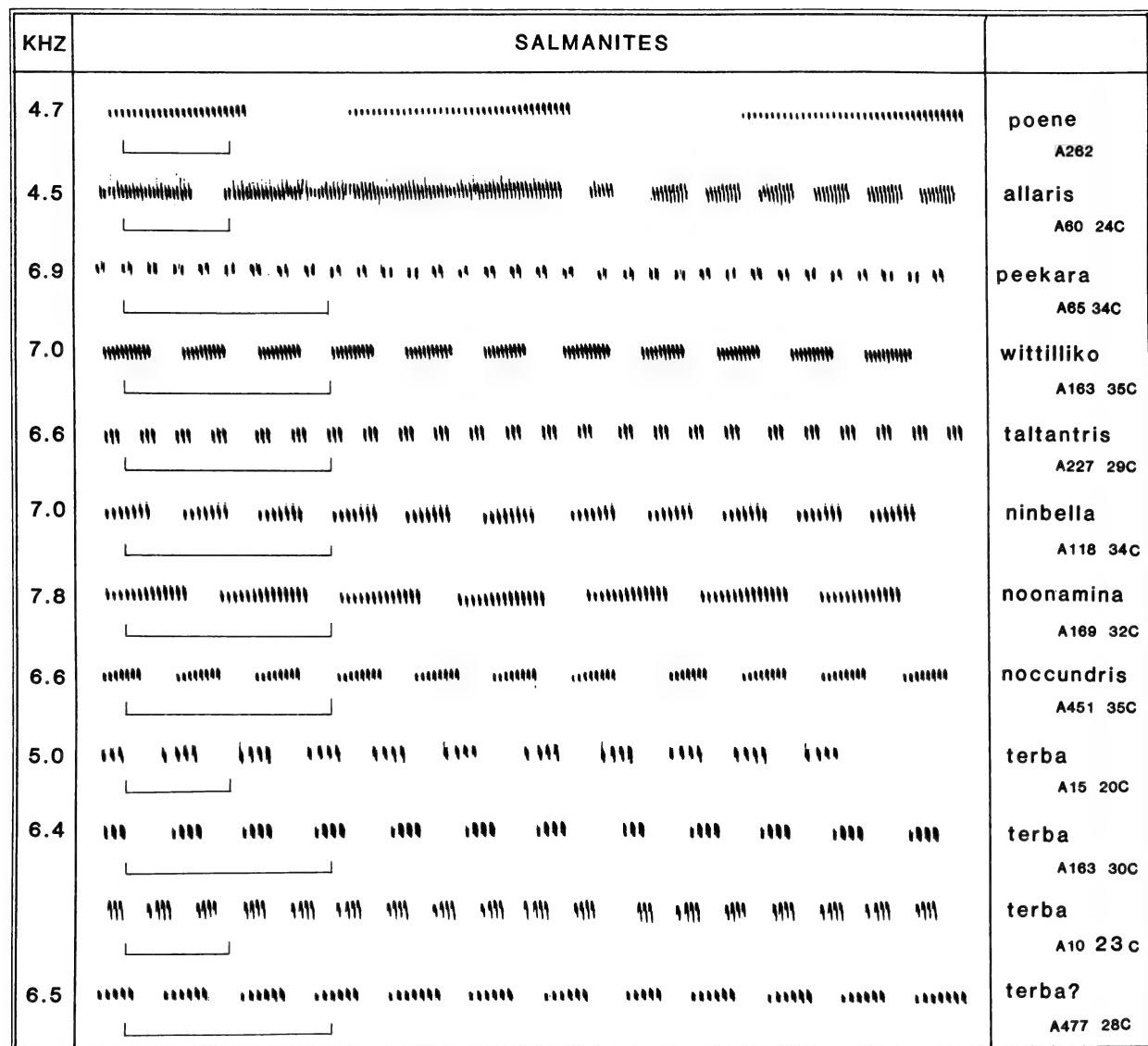
HABITAT. Males found in clumps of dry grass near river, about 3 feet above ground.

SPECIMENS. Holotype ♂ ANC.

Salmanites noccundris n. sp., Figs. 236H, 237FP, 238M

RANGE. Type locality in southeastern QLD.

RECOGNITION. Males: Similar to *S. wittilliko* but differing as follows: Back of head with four dark lines; median dark band on frons wide, but sepa-

FIG. 234. *Salmanites* songs. Scale = 0.5 s.

rated from antennal sockets by narrow pale bands; tibia III with 5 inner and 6 outer subapical spurs; file with 124 teeth. Body length 12.8 mm; FW length 5.8 mm; femur III 7.9 mm; cerci broken.

HOLOTYPE. ♂, A-451, 25 miles north of Noccundra, QLD, 13 ii 1969, ANC.

SONG. Fig. 234. Series of rapid 8-pulse chirps.

HABITAT. Males found in dry creek bed north of Noccundra, QLD.

SPECIMENS. Holotype ♂ ANC.

PEEKARRA GROUP

The three species in this group have setae on the dorsum, but these are thin and not black.

KEY TO MALES OF PEEKARRA GROUP

- Clypeus with spots (Fig. 237M). Cercus 1.6–1.8 times as long as femur III *poene*

	p/s	ch/s	p/ch	kps	°C
A-451	75	5.2	8	6.6	35

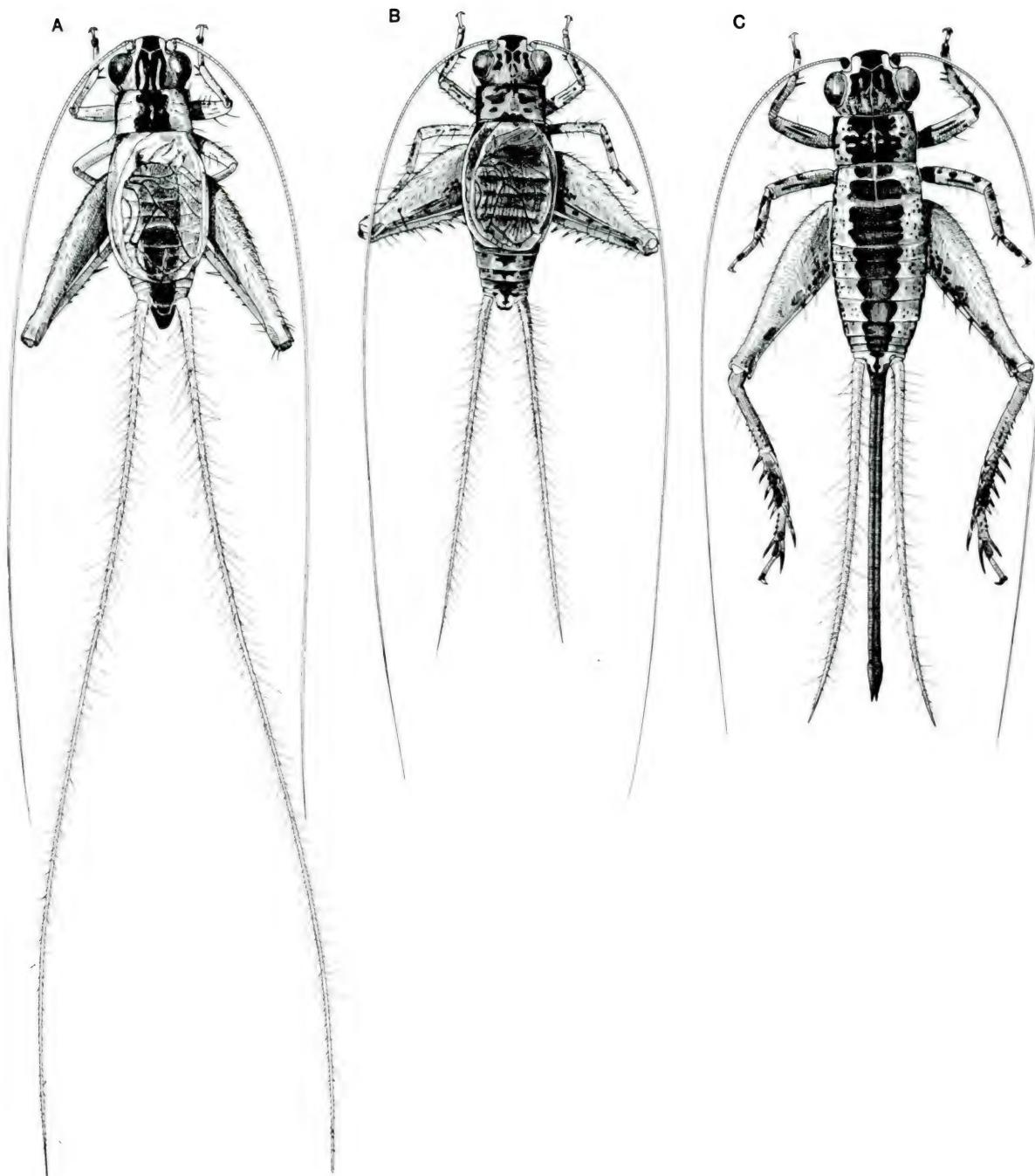


FIG. 235. *Salmanites*. A, *ninbella*; B, *taltantris* male; C, *taltantris* female.

- Clypeus with broad median dark band (Fig. 237GJ). Cercus less than 1.5 times as long as femur III 2
2. File with 140–184 teeth. Cercus about 1.4 times as long as femur III. Genitalia as in Fig. 236B *peekarra*
- File with less than 128–161 teeth. Cercus less than 1.2 times as long as femur III. Genitalia as in Fig. 236A *terba*

***Salmanites peekarra* n. sp.,** Fig. 236B, 237JO, 238AB

RANGE. Eastern QLD.

RECOGNITION. Males: Head similar to *S. terba*. Pronotal disk largely dark with narrow pale bands

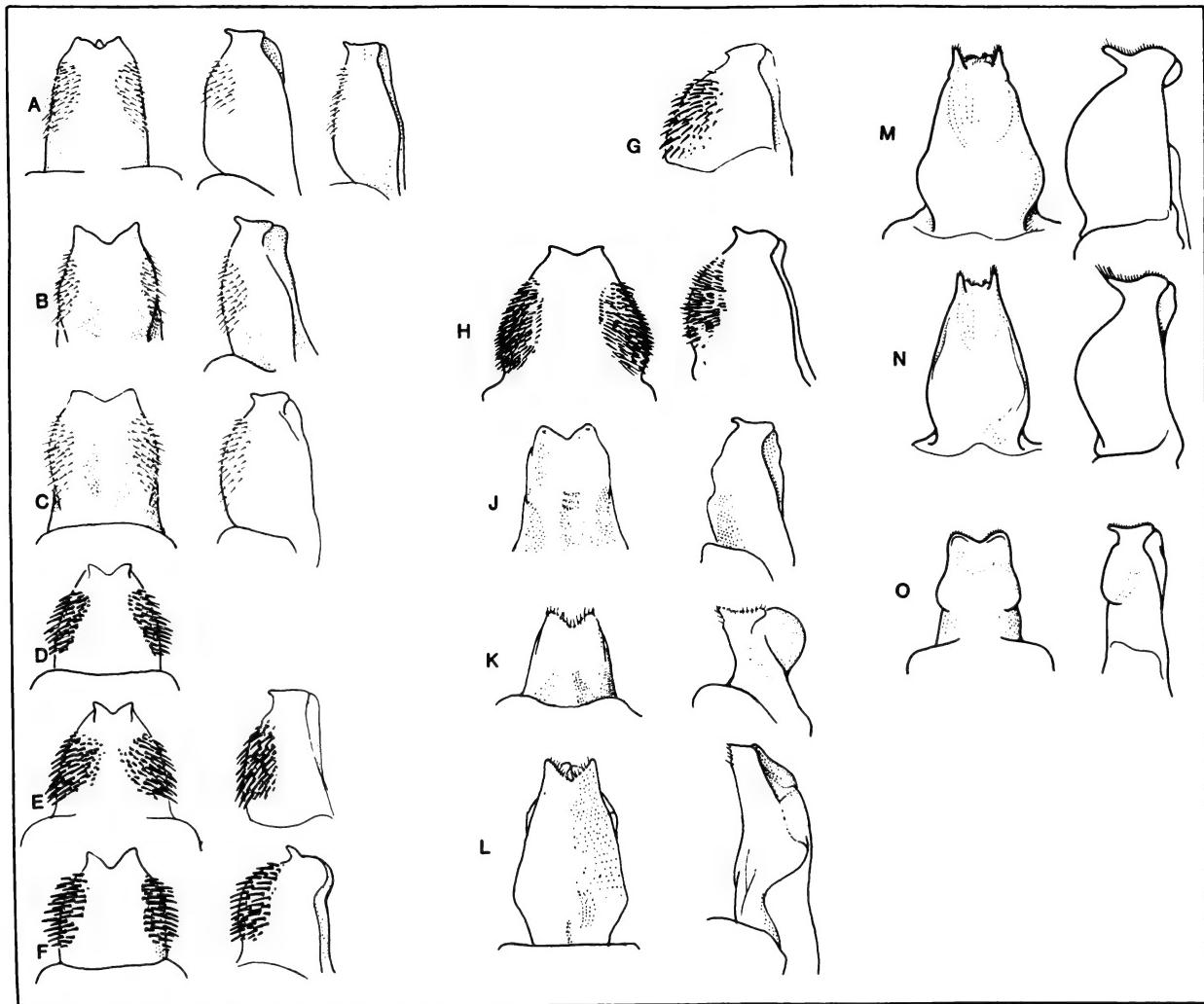


FIG. 236. Male genitalia of *Salmanites* species. A, *terba* A-4; B, *peekarra*; C, *poene*; D, *taltantris*; E, *wittilliko*; F, *wittilliko*; G, *noonamina*; H, *noccundris*; J, *allaris*; K, *ninbella*; L, *obscurifrons*; M, *alta* holotype; N, *alta* paratype; O, *muralappi* holotype.

along lateral margins. Lateral lobes mostly black except ventral extremity. Lateral vertical surface of FW dark. File with 140–184 teeth ($n=5$). Femora I and II mostly pale, without dark stripes. Tibiae I and II with faint dark markings in proximal third. Distal extremity of femur III dark brown. Tibia III with 4 inner and 4 outer subapical spurs and with basal tarsal segment at least 2 times length of 2nd segment. Central dark band at distal end of tergum with irregular lateral margins. Lateral surfaces of abdominal tergum with irregular dark markings in distal segments. Genitalia as in Fig. 236B. Holotype measurements: Body length 13.0 mm; FW length

6.2 mm; femur III length 8.7 mm; cerci 12.5 mm. File with 140 teeth. Male from Sarina had 153 teeth; one from Burdekin River had 184 teeth; two from Condamine had 175, 168 teeth.

HOLOTYPE. ♂, A-65, Warrigal, QLD, 16 ix 1968, ANC.

SONG. Fig. 234. Very rapid succession of two-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-65	62	15.5	2	6.8–7.0	34

HABITAT. Open grassy areas.

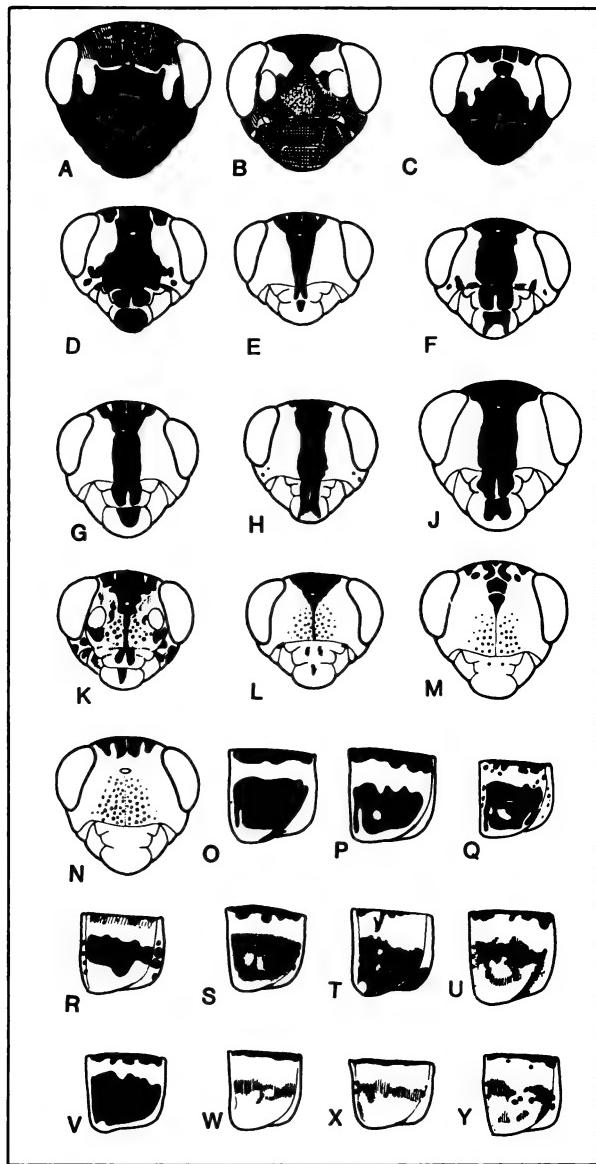


FIG. 237. *Salmanites*. A–N, faces; O–Y, lateral lobes of pronotum and abdomen: A, *obscurifrons*; B, *alta*; C, *taltantris*; D, *wittilliko* A–72; E, *wittilliko* holotype; F, *noccundris* holotype; G, *terba* holotype; H, *allaris* A–35; J, *peekarra* holotype; K, *muralappi* holotype; L, *noonamina* holotype; M, *poene*; N, *ninbella* holotype; O, *peekarra* holotype; P, *noccundris* holotype; Q, *muralappi* holotype; R, *alta* paratype; S, *terba* A–477; T, *allaris* A–35; U, *alta*; V, *wittilliko* A–72; W, *wittilliko* holotype; X, *noonamina* holotype; Y, *ninbella* holotype.

SPECIMENS. Holotype ♂ ANC. Questionable determinations. QUEENSLAND: 24 km S Sarina, 7 ii 1964 (Sedlacek) 1 ♂ BISH. Burdekin R, 40 mi W Collinsville, 18 ix 1950 (Riek) ANC. 8 mi N Condamine, 22 iii 1962 (Chinnick, Corby) 2 ♂ ANC.

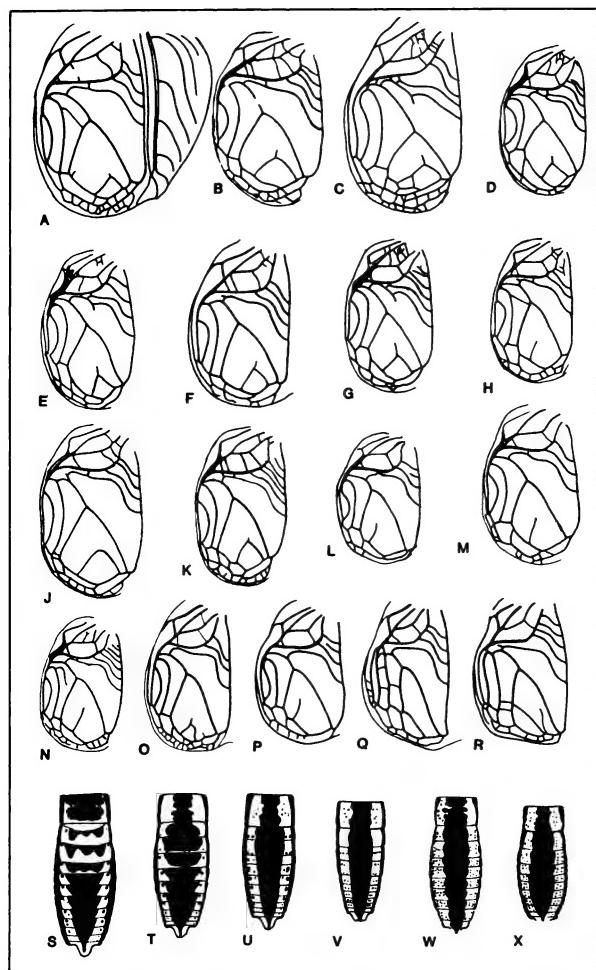


FIG. 238. *Salmanites*. A–R, forewings; S–X, dorsum of female pronotum and abdomen: A, *peekarra*; B, *peekarra*; C, *obscurifrons*; D, *noonamina*; E, *wittilliko*; F, *allaris* holotype; G, *wittilliko* A–227; H, *wittilliko*; K, *terba*; L, *ninbella*; M, *noccundris*; N, *taltantris*; O, *muralappi*; P, *ninbella* holotype; Q, *alta* holotype; R, *alta* paratype; S, *terba* A–477; T, *allaris* A–35; U, *alta*; V, *wittilliko* A–72; W, *wittilliko* holotype; X, *taltantris*.

Salmanites terba n. sp., Figs. 236A, 237GS, 238KS

RANGE. Eastern QLD.

RECOGNITION. Males: Top of head with 4 dark bands; central two bands separated by very narrow line. Dark vertical band on frons with parallel sides; wider than scape. Pronotal disk with irregular dark markings in anterior half. Lateral lobes mostly dark brown, but with several pale areas in ventral half. Mirror with complete dividing vein (Fig. 238K). Number of teeth: holotype, 135; A–15, 161; Lever's

Plateau, 140; Forest Beach, 140; Byrock, 128. Length of basal tarsal segment about 2 times length of 2nd segment. Abdominal tergites 6–9 with distinct central dark band with straight sides. Tenth (10th) tergite with narrow central band about half as wide as base of cerci. Tergites 1–5 mostly dark brown. Posterior margin of 4th tergite with prominent convexity. Lateral surfaces of tergum with horizontal rows of dark spots. Bases of cerci dark ventrally. Subgenital plate elongated, clearly longer than wide. Genitalia as in Fig. 236A.

Females: Tergum of abdomen largely black but with pale bands laterally (Fig. 238S). Face with broad black vertical band. Lateral lobes mostly black. Ovipositor 1.3–1.6 times as long as femur III. Cercus about as long as femur III. Femur III length 7.5–8.3 mm; ovipositor 10–13.3 mm; cerci ca. 8 mm.

HOLOTYPE. ♂, A-4, Townsville, QLD, 16 vii 1968, ANC.

SONG. Fig. 234. Sang in numbers in afternoon, perhaps more strongly on hot, sunny days, and at A-4, A-10, A-15 stopped singing as night came. At Saunders Beach some chirps contained 3 or 4 evenly spaced pulses, but many had the initial pulse a bit separated from the others. Singing often begins with a single-pulse chirp. The chirps with the separated pulse are most common at Saunders Beach. A caged male jumping around near a female sang similar chirps, but in short groups, and the chirps seemed less consistent in their internal patterns. At Stony Creek (A-10) males produced some chirps with the initial pulse somewhat apart from the other three; the first male occasionally, the second nearly all the time.

	p/s	ch/s	p/ch	kps	°C
A-15 n=3	22–23	2.4–2.8	4	4.6–5.0	19
A-10	35	4.2	4	6.0	23
A-477	47	5.4	7	6.5	28

HABITAT. On ground in open grassy tracts and beaches.

SPECIMENS. Holotype ♂ ANC. A-4 1♂ UM. A-10 1♂ ANC. A-15 1♂ 1♀ ANC, 1♂ 1♀ ANSP. A-477 3♂ 1♀ ANC. A-501 1♂ ANC. **Questionable determinations:** QUEENSLAND; Lever's Plateau, via Rathdowney, 12 iii 1966 (Rainey) 1♂ ANC. Forest Beach, 12 mi E of Ingham, 8 v 1961 (Straatman) 1♂ ANC. NEW SOUTH WALES: 30.50S 146.33E, 23 km SE by S of Byrock,

5 iv 1976 (Key et al.) 1♂ 2♀ ANC. Warruh, 1921 (W.W.F.) 1♂ ANC.

Salmanites poene n. sp., Figs. 236C, 237MU

RANGE. Type locality in northcentral QLD.

RECOGNITION. Males: Dark band on frons narrowing ventrally and coming to point at epistomal suture. Clypeus with two vertical dark bands near center. Top of head similar to *S. terba*. Pronotal disk with dark band with highly irregular margins running between anterior and posterior margins. Lateral lobe with irregular dark horizontal band dorsally. Mirror divided. Harp with 4 veins. File with 120–125 teeth. Femora I and II with longitudinal pale brown lines on lateral faces. Tibiae I and II light brown and interspersed with pale markings. Femur III pale, internal face with 3 distinct dark spots along ridge. Dorsum of abdomen with median dark band most distinct in posterior half of tergum and has straight sides. Tergites 4 and 5 convex and sclerotized as in other *Salmanites* species. Lateral margin of tergum with irregular line of dark markings. Subgenital plate distinctly longer than wide. Genitalia as in Fig. 236C. Body length 12.6 mm; FW length 6.0 mm; femur III 8.6 mm; cerci ca. 15.0 mm.

HOLOTYPE. ♂, A-262, near Croydon, QLD, 7 x 1968, ANC.

SONG. Fig. 234. Succession of short trills. Each trill increases slightly in intensity during its course. Males heard singing in morning.

	p/s	tr/s	p/tr	kps	°C
A-262	33	0.6	34–36	4.7	26

HABITAT. Found near ground in tall grass in open eucalypt forest.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♂ ANC.

NINBELLA GROUP

The five species in this group may not be closely related. They are placed together here only because the epiphallus lacks setae on the dorsal surface.

KEY TO MALES OF NINBELLA GROUP

- Face dark brown or black (Fig. 237AB) 2
- Face with broad central black band or spotted 3
- Face shiny black. File with 75–80 teeth. Genitalia as in

- Fig. 236L. Cerci shorter than femora III. Mirror divided *obscurifrons*
 Face dark brown. File with 58 teeth ($n=1$). Cerci about twice as long as femur III. Mirror narrow, not divided (Fig. 238QR) *alta*
 3. Face with broad median black band (Fig. 237H). Cercus about 1.3 times as long as femur III *allaris*
 Face lightly or heavily spotted 4
 4. Face heavily spotted as in Fig. 237K. Genitalia as in Fig. 236O. Mirror divided (Fig. 238O) *muralappi*
 Face lightly spotted (Fig. 237N). Genitalia as in Fig. 236K. Mirror not divided (Fig. 238L) *ninbella*

Salmanites ninbella n. sp., Figs. 235, 236K, 237NY, 238LP

RANGE. Type locality in northcentral NT.

RECOGNITION. Males: Pale species, without dark band on lateral surface of abdominal tergites. Face pale, with small brown spots and without central black band. Dorsum of head with 4 longitudinal dark bands. Pronotal disk with longitudinal median dark band, about one third as wide as pronotum, running between anterior and posterior margins. Lateral lobes with irregular band along upper side. Mirror incompletely divided. File with 85 teeth. Dorsum of abdomen with median reddish brown band on posterior segments; this band much lighter than central band on pronotum. Legs as in *S. talantris*. Basal tarsal segment of leg III less than twice as long as middle segment. Subgenital plate wider than long. Cerci little less than twice body length. Genitalia as in Fig. 236K. Body length 12.8 mm; FW length 4.6 mm; femur III length 8.2 mm; cerci ca. 20 mm.

HOLOTYPE. ♂, A-118, 32 miles N of Mataranka, NT, 22 ix 1968, ANC.

SONG. Fig. 234. Succession of 7-pulse chirps. Song similar to *S. nooccundris*.

	p/s	ch/s	p/ch	kps	°C
A-118	62	5.3	7	6.8-7.2	34

HABITAT. Open grassy areas.

SPECIMENS. Holotype ♂ ANC.

Salmanites allaris n. sp., Figs. 236J, 237H, 238FT

RANGE. Northeastern coastal QLD.

RECOGNITION. Males: Similar to *S. peekarra* but differing as follows: Vertical surfaces of FW's light brown, transparent; harp with 4 veins; file with 92

teeth; femora I and II with prominent dark spots at bases of setae; tibiae I and II mostly brown and with pale spots; dorsal surface of femur III with longitudinal brown area with indefinite margins. Body length 11.2 mm; FW length 5.5 mm; femur III length 7.9 mm; cerci ca. 10.0 mm.

Females: Body coloration similar to male. Second (2nd) and third (3rd) tergal segments following pronotum reddish centrally, and with black margins. Side of head behind eyes with cluster of dark spots. Posterior margin of subgenital plate with V-shaped indentation. Ovipositor and cerci nearly equal in length. Body length 12.0 mm; femur III length 8.6 mm; ovipositor 9.2 mm; cerci 9.6 mm.

HOLOTYPE. ♂, A-35, Leichardt Creek, N of Mt. Malloy, QLD, 5 ix 1968, ANC.

SONG. Fig. 234. Succession of trills at about 4/s at 24°C. Groups of short trills begin with one or two long trills lasting 1–2 seconds.

	p/ch					
	p/s	ch/s	a	b	kps	°C
A-60 n=2	52, 53	3.7	ca. 80	9	4.7	24

a, longer trills at beginning of song; b, shorter trills making up most of the song.

HABITAT. Numbers of males singing in dry grass on ground in sunlight in mid-afternoon.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 6♂ 1♀ ANC.

Salmanites muralappi n. sp., Figs. 236O, 237KQ, 238O

RANGE. Type locality in eastern Arnhem Land.

RECOGNITION. Males: Face strongly spotted and clypeus with narrow median black band. Lateral lobes largely blackish. Central ⅔ of pronotal disk blackish and with many black spots in lateral regions. Front upper outer face of femur III with distinct narrow oblique stripes. Legs I and II strongly banded and spotted. FW venation as in Fig. 238O. File with 60 teeth. Femur III length 5.5 mm.

HOLOTYPE. ♂, 12.21S 136.44E, 9 km WNW of Dhupuma Coll., near Nhulunbuy, NT, 19 vi 1975 (Key, Balderson, Freeman) ANC.

SONG. Not known.

HABITAT. Not known. Probably savanna woodland.

SPECIMENS. Holotype ♂ ANC.

Salmanites obscurifrons Chopard, Figs. 236L, 237A, 238C

Salmanites obscurifrons Chopard 1951: 483. Holotype. ♂, Byfield, near Yeppoon, QLD, x 1924 (A. Musgrave) AM. Examined.

RANGE. Mountains of northeast QLD.

RECOGNITION. Males: Body color generally dark. Head and abdomen not clearly banded. Face black. Dorsum of head with scattered dark spots, arranged into bands in posterior portion. Maxillary and labial palpi dark brown. Pronotal disk brown and grainy in appearance. Lateral lobes entirely black. Mirror with complete dividing vein. Stridulatory file with 75–80 file teeth. Legs I and II almost entirely black. Femur III dark brown, with 4 inner and 4 outer subapical spurs. Dorsum of abdomen mostly black, somewhat lighter in last 4 segments on either side of central line. Tergites 4 and 5 unmodified and without the prominent convexities found in other species of *Salmanites*. Genitalia in Fig. 236L. Body length 14–15 mm; FW length 6.7 mm; FW width 4.7 mm; femur III 8.8 mm; cerci ca. 7.1 mm.

SONG. Succession of complex chirps, each a little over a second and composed of about 13 very short units initially at 6–7/s, but accelerating to about 30/s and then into smooth trill about 0.25 second. Rate of production of entire chirp is 6/10 s at 24.5°C. Pulse rate 107/s. Males sang only in daytime.

HABITAT. Abundant in leaf litter and grass in dry recently burned eucalypt forest.

SPECIMENS. Holotype ♂ AM. A-52 2♂ 1j♀ ANC, 1♂ ANSP.

Salmanites alta n. sp., Figs. 232, 236MN, 237R, 238QRU

RANGE. Extreme northern NT.

RECOGNITION. Males: Face entirely dark brown (Fig. 237R). Mirror without dividing vein and very narrow (Fig. 238QR). Lateral lobes black at least in upper half. Genitalia as in Figs. 236MN. File with 58 teeth (holotype). Dorsum of abdomen largely black but with line of pale marks along dorso-lateral region. Venter of abdomen pale. Subgenital plate with median dark streak. Cerci about 2 times as long as femur III. Femur III length 7–8 mm.

Females: Face dark brown as in males. Dorsum of thorax and abdomen banded as in Fig. 232; pale band with two rows of small dark spots. Ovipositor

1.25, 1.38 times as long as femur III. Femur III ca. 8.5 mm.

HOLOTYPE. ♂, 12.50S 132.51E, 16 km E by N of Mt. Cahill, NT, 10 iii 1973 (Key et al.) ANC.

SONG. Not known.

HABITAT. Probably grasses in open woodland.

SPECIMENS. Holotype ♂ ANC. NORTHERN TERRITORY: Same data as holotype, 2♀ ANC. 12.52S 132.50E 14 km E Mt. Cahill, 7 iii 1973 (Key et al.) 1♂ ANC. 12.51S 132.52E, 15–22 km E of Mt. Cahill, 9 iii 1973 (Key et al.) 1♂ ANC. 12.25S, 132.58E, 1 km N of Cahills Crossing, East Alligator R, 29 v 1973 (Key et al.) 1j♂ ANC. Maningrida, Arnhem Land, 18 iii 1961 (Gressitt) 1♂ BISH.

IKNURRA GROUP

The only species in this group is represented by a single female. She is much larger than all other *Salmanites* species and has short wings.

Salmanites iknurra n. sp.

RANGE. Type locality in Iron Range, Cape York Peninsula.

RECOGNITION. Females: Large—body length ca. 20 mm. FW's present, oval, about as long as pronotum. Head narrower than pronotum. Dorsum of abdomen largely chocolate brown in color. Legs I and II with conspicuous dark marks and bands. Outer face of femur III with closely spaced brown oblique stripes and lower margin with row of black spots. Ovipositor 0.9 times as long as femur III. Cerci nearly as long as femur III. Femur III length 15.5 mm; ovipositor 14 mm.

HOLOTYPE. ♀, Iron Range, Cape York Peninsula, QLD, 27 iv to 4 v 1973 (Monteith) UQC.

SONG. Not known.

HABITAT. Possibly open forest or rain forest.

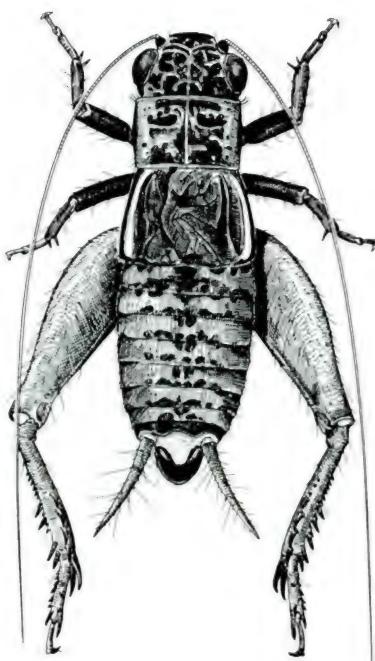
SPECIMENS. Holotype ♀ UQC.

Genus LEBINTHUS Stål

TYPE SPECIES. *Lebinthus bitaeniatus* Stål 1877: 50.

In his catalogue Chopard (1968) includes 7 species in this genus. Six of the species are from the area north of Australia: Malaysia, the Philippines, and New Guinea. We add one species.

Both Australian species apparently live on the ground and *L. miripara* was found in the daytime among woody debris in a dry mulga woodland.

FIG. 239. *Lebinthus miripara*.

RECOGNITION. The two Australian species are easily separated from other Eneopterini by the following characteristics: FW's less than twice as long as pronotum. Mirror absent. Rostrum 3.4 to 4.2 times as wide as scape. FW's of females tiny scales, less than half as long as pronotum. Hind femora very wide, varying from orange to dark brown. Dorsal-lateral body angle with pale lines (Fig. 239).

bifasciatus

1. File with ca. 64 teeth.
2. Cerci shorter than femur I.
3. Ovipositor about 1.2 times as long as femur III.
4. Male genitalia as in Fig. 241A.
5. Male FW venation as in Fig. 241A.

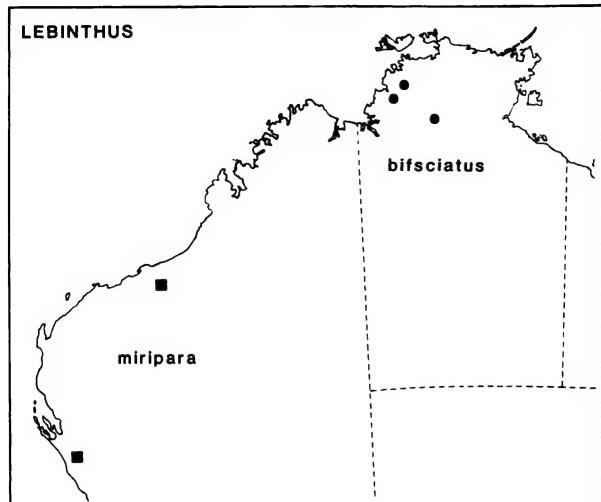
miripara

1. File with 106, 108 teeth.
2. Cerci longer than femur I.
3. Ovipositor about 2.5 times as long as femur III.
4. Male genitalia as in Fig. 241B.
5. Male FW venation as in Fig. 241B.

***Lebinthus miripara* n. sp., Figs. 239, 241B**

RANGE. Northwestern WA.

RECOGNITION. Males: Body proportions and patterning shown in Fig. 239. Dorsum of body deep rusty-brown with speckled appearance. Face, side of head, side of pronotum, and side of FW dark

FIG. 240. *Lebinthus* distributions.

brown or black. Femora I and II black. Tibiae I and II dark brown. Femur III rusty colored. Body length 10 mm. FW length 2.3 mm.

Females: Coloration similar to male. FW's small oval pads about $\frac{1}{2}$ length of femur I and located mainly on side of body. Cerci very short, slightly longer than femur I. The ovipositor 0.67 times as long as body. Body length 14 mm. Ovipositor length 9.4 mm.

HOLOTYPE. ♂, A-694, 85 miles N of Geraldton, WA, 10 v 1969, ANC.

SONG. Succession of 10- to 11-pulse chirps with pulse rate of 70/s and chirp rate of 2 per second at 23°C.

	p/s	ch/s	p/ch	kps	°C
A-694	70	2.0	10-11	5.2	23
A-881	73	2.7	12-13	6.3	31
A-881	80	2.7	10	7.0	31

HABITAT. Found singing during day on ground and on pieces of wood lying on ground in lightly wooded country.

SPECIMENS. Holotype ♂ ANC. A-694 1♀ ANC.

***Lebinthus bifasciatus* Chopard, Fig. 241A**

Lebinthus bifasciatus Chopard 1951: 482. Holotype ♂, Daly River, NT (H. Wesselman) SAM. Type examined.

RANGE. Northwestern NT.

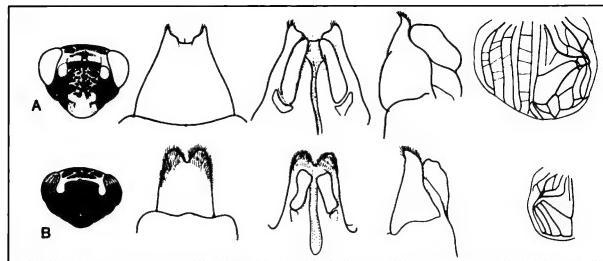


FIG. 241. *Lebinthus*, face, dorsal, ventral, and lateral view of male genitalia, and forewing venation. A, *bifasciatus*; B, *miripara*.

RECOGNITION. Males: (See also description by Chopard). Differing from *L. miripara* as follows: Genitalia as in Fig. 241A; file with 106, 108 teeth; FW venation as in Fig. 241A; femora I and II strongly patterned with black or dark brown; tibiae I and II slightly banded; face brown on clypeus and marbled with yellow; side of head not black but with brown markings behind eyes. Measurements of Tindal male: Rostrum 3.38 times as wide as scape. Head 2.59 times as wide as rostrum. FW 1.58 times as long as pronotum and 0.38 times as long as femur III. Tibia III 0.69 times as long as femur III.

Females: A female believed by Chopard (1951) to belong to this species has very minute FW's; ovipositor about 2.5 times as long as femur III; femur III 10 mm.

SONG. Not known.

HABITAT. Probably litter in open woodland.

SPECIMENS. Holotype ♂ SAM. 14.31S 132.22E, Tindal, 8 mi ESE Katherine, NT, 6 xii 1967 (Vestjens) 1♂ ANC. 5 mi NW Adelaide River (town) NT, 31 x 1965 (Mesa, Sandulski) 1♂ ANC.

Genus CARDIODACTYLUS Saussure

Cardiodactylus Saussure 1878. Type species: *Gryllus (Platydactylus) novae-guineae* Haan 1842: 233.

The genus includes 7 nominal species (Chopard 1968: 350). All are from the Australasian region and four listed from Australia. The type of *C. rufidulus* was not located in the Paris or Geneva Museums. That of *C. gaimardi* is practically destroyed and the type locality is merely listed as "Australia." The type of *C. canotus*, from the Solomon Islands, could not be located in the Paris Museum. The type of *novae-guineae* was examined in the South Aus-

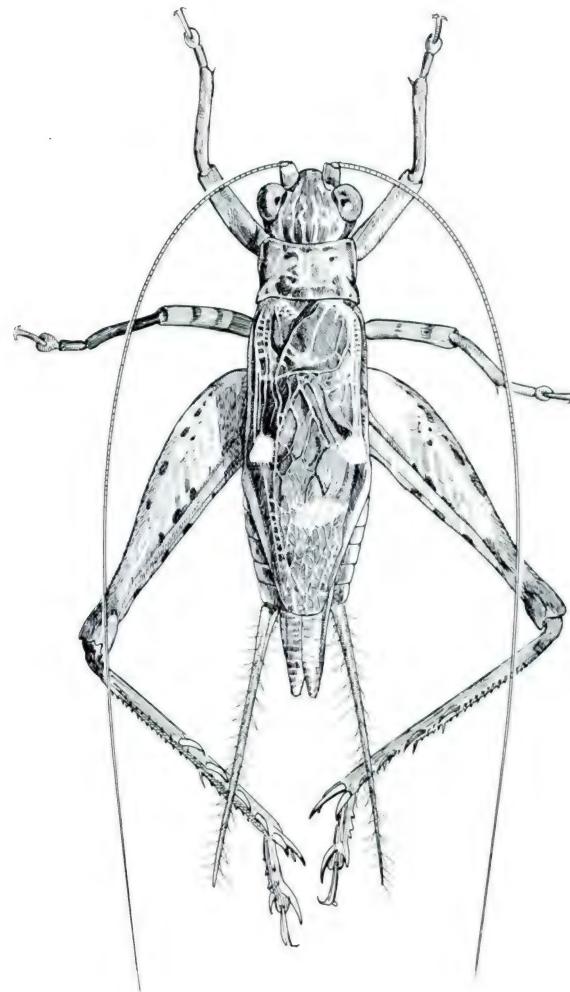


FIG. 242. *Cardiodactylus novaeguineae*.

tralian Museum. Thus the number of species known to be from Australia is reduced to one.

Cardiodactylus species inhabit mainly coastal regions and may be found in mangrove and other thickets on Pacific islands. In Australia the group is known from coastal north Queensland and neighboring islands.

RECOGNITION. This genus may be distinguished from other Australian Eneopterini by the following characteristics: Inner tympanum slit-like (Fig. 243E) (all other Eneopterini lack inner tympanum). Outer tympanum well-developed and oval, as in other tribes. FW with well-developed apical area but with incomplete mirror (Fig. 243AB). (All other Australian genera with large apical area possess complete mirrors.)

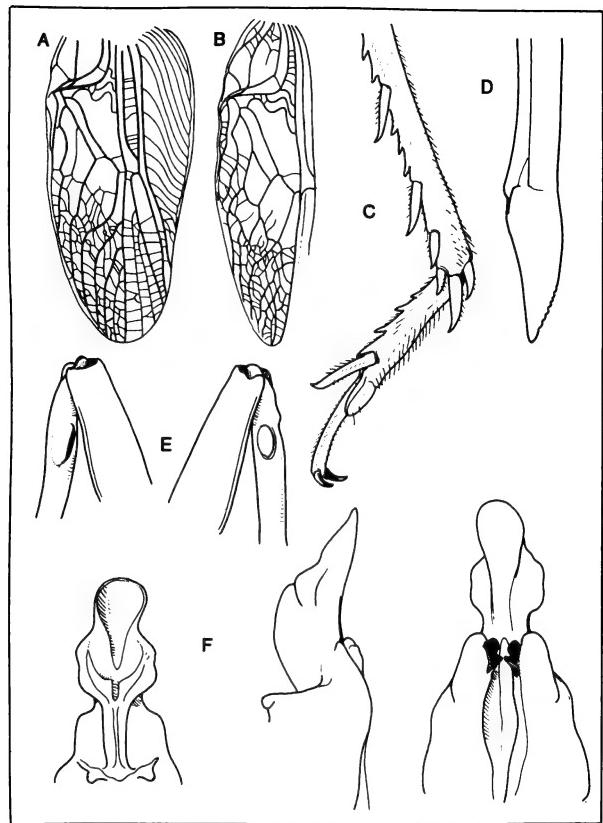


FIG. 243. *Cardiodactylus novae-guineae*. A, B, forewings; C, outer face of tibia III; D, end of ovipositor; E, inner (left) and outer (right) faces of tibia I; F, dorsal, lateral, and ventral views of male genitalia.

NOMINA DUBIA

Platydactylus gaimardi Serville 1839: 336. The type in the Paris Museum is largely destroyed and the type locality is listed as "Australia."

Cardiodactylus rufidulus Saussure 1878: 523. The type of this species was not found in Paris or Geneva. The type locality is listed as "Australia."

Cardiodactylus novae-guineae (Haan), Figs. 242, 243

Gryllus (Platydactylus) novae-guineae Haan 1842: 233. Holotype ♂, transferred to *Cardiodactylus* by Chopard 1951: 481. Location of type not known.

RANGE. Coastal thickets of northeastern QLD.

RECOGNITION. Males: Body shape and patterning as in Fig. 242. Top of head striped. Face pale yellow-brown. Lateral lobes lighter than disk, darker than shoulder. Forewings pale around bases of

veins 1A and 3A. Mirror incomplete, venation as in Fig. 243AB. With 107–112 file teeth (n=3). Lateral field of wing with 18 veins. R and M veins fuse for about 1.5 mm in central part. Subcosta bordered below by black band. Legs reddish-brown with faint darker spots. Tympana as in Fig. 243E. Tibia III with 4 internal and 4 external subapical spurs—internal ones stouter and about 50% longer than external ones. External apical spurs as in Fig. 243C. Genitalia as in Fig. 243F. Body length 26 mm; with wings 29 mm; femur III 19 mm; tibia III 17.5 mm.

Females: Coloration similar to male except wings marked as follows: lateral field generally dark but with white to pale yellow Sc and branches. R vein brown. M and Cu closely opposed and pale yellow to middle of wing where they turn brown. Cu₂ vein pale in middle of first half. Five of main longitudinal veins on dorsal field are branches of Cu₂. Cu₁ not having branches except at its distal end. Basal areas of forewing (around bases of Cu₂, 1A, 2A, and 3A) also pale. Abdomen grey-brown and pubescent. Legs yellowish and covered with numerous reddish spots. Largest of these spots about as big as ocelli. Ovipositor about as long as femur III. Tip of ovipositor split such that left and right half comprised of inner and outer layer which lie flat against one another (Fig. 243D).

SONG. We recorded a single male who may have been making a combination of calling and courtship songs. The song had a raspy quality and was low in intensity (Fig. 223).

HABITAT. Collected in a woody thicket on Green Island, near Cairns. Evidently only occurs in coastal area in the Pacific.

SPECIMENS. A-282 ANC. QUEENSLAND: Kurduda, SAM. Cairns, SAM. Stacy Island, AM. South Cape, AM. Dunk Island, QM. Green Island, ANC. Somerset, Cape York, uqc. Hillsborough, uqc.

TRIBE PODOSCIRTINI

This large world-wide tribe previously had 56 described genera (Chopard 1968). In Australia there are nine genera; five of them are new. The tribe is better represented in the wetter parts of north Australia, particularly in Queensland. The members of six of the genera either lack a stridulatory apparatus or have never been tape-recorded. The genera *Ma-*

dasumma and *Tamborina* are loud singers. All genera except *Tozeria* and *Euscyrtus* have well-developed hind wings and are often captured at light traps.

RECOGNITION. This tribe can be distinguished from the Itarini and Eneopterini by the following characters: (1) Outer apical spurs of tibia III nearly equal in length (in Eneopterini and Itarini middle spur much longer). (2) Condition of auditory tympana variable, but no species have large outer tympanum and at same time lack inner tympanum.

Madasumma Genus Group

1. Tibia I with inner and outer tympanum.
2. FW's extending beyond abdomen in both sexes.
3. Male FW's with a large, once-divided mirror (Fig. 248).
4. Male FW's with stridulum.
5. Head narrower than pronotum.
6. Claws not serrated.
7. Ovipositor slightly clubbed at end (Fig. 253MNO).

Hemiphonus Genus Group

1. Tibia I with both inner and outer tympanum (*Hemiphonus*, *Riatina*, *Mundeicus*, *Umbulgaria*) OR with only an inner tympanum (*Aphonoides*, *Unka*).
2. FW's extending beyond abdomen in both sexes.
3. Male FW's with mirror (some *Riatina*) OR without mirror (*Hemiphonus*, *Mundeicus*, *Aphonoides*, *Umbulgaria*, *Unka*).
4. Male FW's with stridulum (*Riatina*, *Hemiphonus*, *Unka*) OR without stridulum (*Mundeicus*, *Umbulgaria*).
5. Head variable, as wide as pronotum or narrower.
6. Claws not serrated.
7. Ovipositor slightly clubbed at end (Figs. 267J–M, 276O–Z).

Euscyrtus Genus Group

1. Tympana variable—with inner and outer, or with inner only, or without either tympanum.
2. FW's not reaching end of abdomen (except *Patiscus*).
3. Male FW's without distinct tympanum (but *Merrinella tandanya* with small one).
4. Male FW's without stridulum (except *Merrinella tandanya*).
5. Head distinctly wider than pronotum (equal in width in *Patiscus*).
6. Claws serrated (except *Tozeria* and *Turana*).
7. Ovipositor tapering at end (Fig. 289P).

KEY TO GENERA OF PODOSCIRTINI

1. FW's extending beyond end of abdomen in both sexes and/or claws serrated 2
- FW's not reaching end of abdomen in either sex 8
2. Veins M and R fused briefly in anterior half (Fig. 266) 3
- Veins M and R not fused as in Fig. 266 4
3. Male FW's with stridulum (Fig. 266OQ) *Hemiphonus*
- Male FW's without stridulum (Fig. 266A–M) *Mundeicus*

4. Tympana present only on inner face of tibia I	5
Tympana present on both inner and outer faces of tibia I	6
5. Male FW with stridulum (Fig. 284B)	<i>Unka</i>
Male FW without stridulum	<i>Aphonoides</i>
6. Head flattened (Fig. 257). Head as wide or wider than pronotum. Mirror usually absent	<i>Riatina</i>
Head not so flattened. Head narrower than pronotum. Mirror always large and divided by one vein (Fig. 248AB)	7
7. Face darkly banded (Fig. 253A–G)	<i>Tamborina</i>
Face more or less unicolorous	<i>Madasumma</i>
8. Tibia I without tympana	9
Tibia I with tympana	11
9. Claws not serrated. Tibia I shorter than pronotum at center	10
Claws serrated. Tibia I longer than pronotum at center	<i>Merrinella</i> (part)
10. Both sexes with FW's. Body color brownish. Head and pronotum without contrasting stripes (Fig. 288H)	<i>Tozeria</i>
Both sexes without FW's. Body with contrasting black and yellow bands (Fig. 288EFG)	<i>Turana</i>
11. Male FW with stridulum (Fig. 289N)	<i>Merrinella</i> (part)
Male FW without stridulum	12
12. Tibia III with 12–13 inner and 8–9 outer subapical spurs. Body color straw-yellow to straw-white	<i>Patiscus</i>
Tibia III with 8–9 inner and 6–8 outer subapical spurs. Body usually with strong black stripes (Fig. 288A)	<i>Euscyrtus</i>

MADASUMMA GENUS GROUP

Madasumma

1. Face more or less unicolorous, at least without strong dark bands.
2. Legs I and II not strongly banded.

Tamborina

1. Face strongly banded with black (Fig. 253A–G).
2. Legs I and II strongly banded (Fig. 253HJ).

Genus MADASUMMA Walker

Madasumma Walker 1869: 87. Type species: *Madasumma ventralis* Walker 1869 v. 1: 65, by original designation.

Chopard's (1968) catalogue lists 51 species of *Madasumma*. Most species are from the region bounded by Java, the Philippines, and India. Four species are listed from Madagascar and six species from Australia. The Australian species Chopard discussed belong to two different genera, *Madasumma* and a new genus, *Tamborina*. Three of the names are here treated as *nomina dubia* (see below). These are *M. aperta*, *M. planiceps*, and *M.*

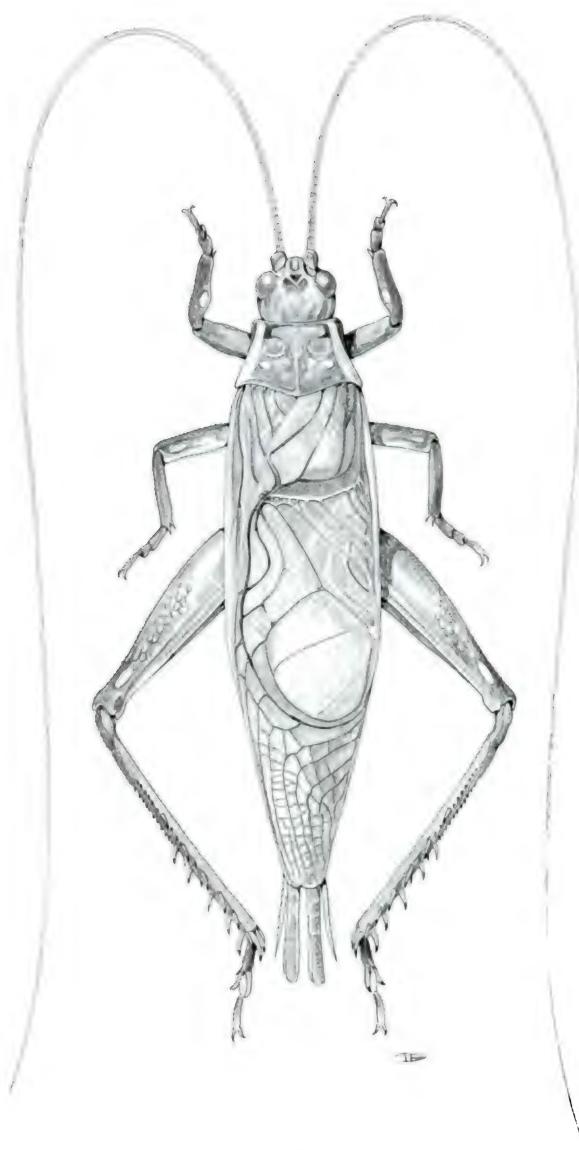


FIG. 244. *Madasumma affinis*.

continua. *Madasumma obscura* is placed under the new genus *Umbulgaria*. We add six species.

RECOGNITION. The Australian species of *Madasumma* may be distinguished from other podoscircitine genera by the following combination of characteristics: Body shape usually as in Fig. 244. Males with stridulatory file and large mirror (Fig. 248). Inner and outer tympana both well-developed. Head narrower than pronotum. Lateral margins of pronotum (top view) straight or slightly concave. Disk of pronotum lighter than lateral lobes. Face

largely pale and unbanded (banded in *Tamborina*). Legs I and II with small spots but not strongly banded (banded in *Tamborina*). Genitalia as in Figs. 247A-E.

Affinis Group

1. Male FW yellowish in area between M and R veins.
2. Antennae not strongly banded.

Loorea Group

1. Male FW brownish between M and R veins.
2. Antennae strongly banded (Fig. 248D)

NOMINA DUBIA

Madasumma hornensis Chopard 1951: 496. Holotype ♀, Horn Island, Torres Straits, SAM. Females of this genus are very difficult to separate and we are unable to determine which if any of the Affinis Group species this female belongs to. When males are collected the status of this name will doubtless be clarified.

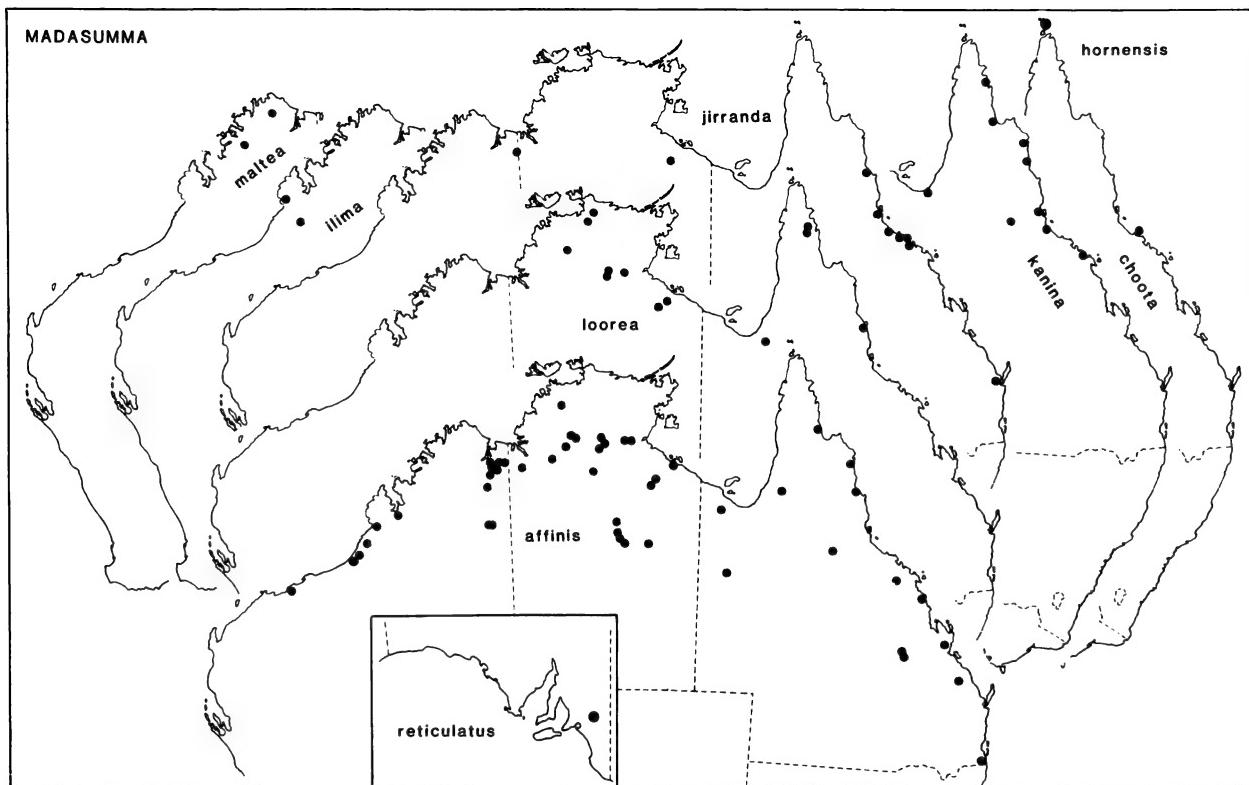
Madasumma reticulatus Chopard 1951: 496. Holotype ♀, Karoonda, SA, SAM. This is the only individual known from temperate Australia. We believe that this group does not occur in South Australia. Furthermore, this female cannot be separated from other species of the Affinis Group.

Calyptotrypus aperta Saussure 1878: 576. *Madasumma aperta*, Chopard 1951: 493. Holotype ♀, Rockhampton, type not found in Vienna where Chopard says it is.

Calyptotrypus planiceps Saussure 1878: 572. *Madasumma planiceps*, Chopard 1951: 495. Holotype ♀, Cape York, type not found in Vienna Museum.

AFFINIS GROUP

This group of four species differs from the Loorea Group by having the area between the R and M veins and between the M and Cu₁ veins yellowish, and by lacking strongly banded antennae. In females the Cu₁ vein is more or less continuously yellowish (in the Loorea Group it is yellow only where it branches). Side of head often marbled with fine brown or reddish lines. Pronotal disk often dark reddish-brown with scattered lighter spots and darker laterally than centrally; pale along the shoulders. Lateral lobes much lighter than disk and slightly spotted. Major veins of FW dorsal field darker than surrounding membrane. Tibia III usually with 6 inner and 6 outer subapical spurs. Last of these very close to 3 inner and 3 outer apical

FIG. 245. *Madasumma* distributions.

spurs. Venter of abdomen mostly pale but often with medial brown area, most pronounced in apical half.

Subgroup A (*affinis*, *kanina*, *jirranda*)

1. M vein yellow (except *jirranda*).
2. Genitalia as in Fig. 247A.
3. Harp with 5–7 veins.

Subgroup B (*ilima*)

1. M vein yellow.
2. Genitalia as in Fig. 247B.
3. Harp with 6 or more veins.

Subgroup C (*choota*)

1. M vein dark brown.
2. Genitalia as in Fig. 247C
3. Harp with 4 veins.

Madasumma affinis Chopard, Figs. 244, 247A, 248A

Madasumma affinis Chopard 1925: 47. Holotype ♂, Alice River, QLD (Mjöberg) sm. Type examined.

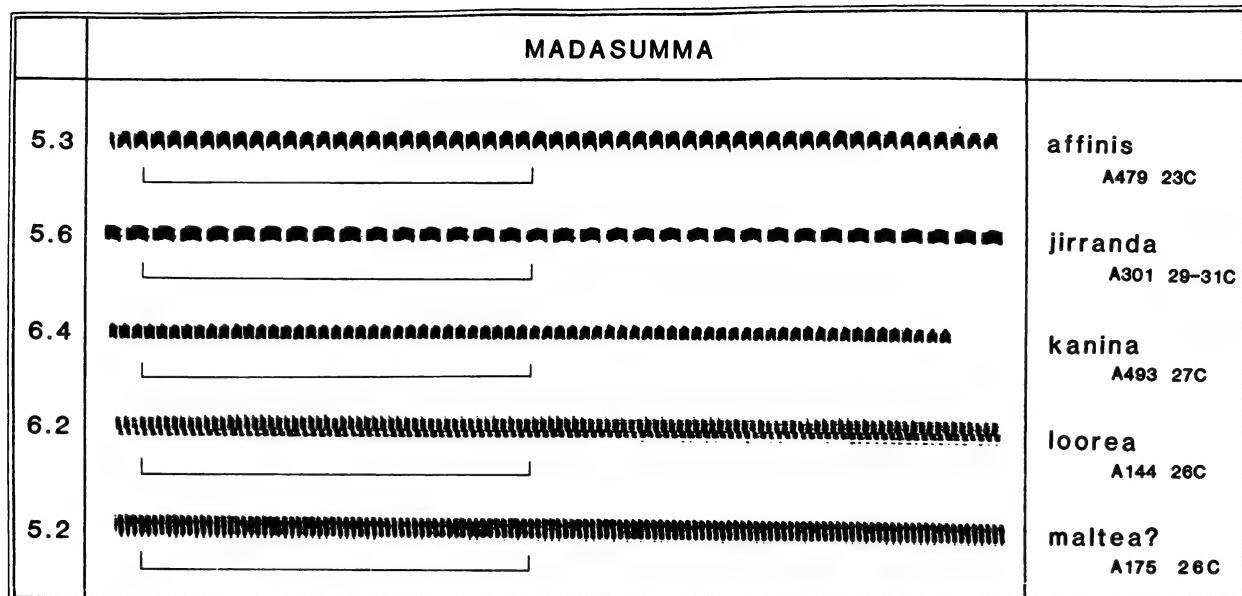
RANGE. Widespread across northern Australia and eastern QLD.

RECOGNITION. Males: Almost indistinguishable morphologically from *M. jirranda* and *M. kanina* but differing in song, and M vein entirely yellow (as in *M. kanina*). Genitalia also very similar (see Fig. 247A). File with 104–135 teeth (n=18). At present *M. affinis* and *M. kanina* distinguished only by songs.

Females: Similar to males in color. Body length to end of HW 30 mm; FW length 20.5–22 mm; femur III length 12–13 mm; ovipositor length 11–11.5 mm; cerci ca. 11 mm.

VARIATION. Following file counts obtained from specimens across northern Australia: A–107 (120, 121, 130 teeth); 127 (119); 751 (104); 510 (108); 755 (107); 753 (106); 170 (127, 129); 164 (127, 129, 131, 131); 767 (132, 133, 135); 479 (118, 117); Beames Brook QLD (130); Flinders River QLD (110).

SONG. Fig. 246. Continuous loud trill only at night. Males from Northern Territory sometimes produce short trills only at end of song or at both beginning and end.

FIG. 246. *Madasumma* songs. Scale = 0.5 s.

	p/s	kps	°C	
A-99 n=2	36.5-38.0	5.2-5.4	21	
A-107 n=2	39.0-47.7	5.3	20.5	
A-28-29	38.0	3.9	21-24	
A-37	41.0	4.8	21	
A-127	47.0	6.0	28	
A-164	50.6	—	30	
A-170	42.0	—	26.7	
A-293	46.6	4.2	18.3	
A-298	42.0	5.0	18.3	
A-479	47.0	5.3	22.8	
A-511	52.8	6.3	31	
A-517	43.0	5.2	24	
A-540	43.0	4.1	21	
A-738	44.0	4.9	19.5	
A-758	45.0	4.8	19	
A-767	45.0	5.5	23	

HABITAT. Males found at night on branches of trees 6-8 feet high or in low trees and in shrubs.

SPECIMENS. Holotype ♂ SM. A-99 2♂ ANC. A-107 3♂ ANC. A-127 1♂ UM. A-164 4♂ ANC. A-170 2♂ ANC. A-179 1♂ 1♀ ANC. A-180 1♂ ANC. A-235 5♂ ANC. A-479 2♂ ANSP. A-510 1♂ ANC. A-751 1♂ ANC. A-753 1♂ ANC. A-755 1♂ ANC. A-767 3♂ 1♀ ANC. WESTERN AUSTRALIA: Kimberley Res. Sta. via Wyndham, 30 iii 1955 (Langfield) 1♂ ANC. Kununarra, 20 viii 1975 (Bailey) 1♀ ANC. 25 mi ESE Broome, 16 iv 1963 (Chinnick) 1♂ ANC. NORTHERN TERRITORY: 19.24S 135.58E, 15 km SW Alroy Downs HS, 10 iv 1976 (Key et al.) 2♂ 2♀ ANC. 15.05S 133.07E, Elsey Ck, 19 km SSE Mataranka, 14 v 1973 (Upton et al.) 1♂ ANC. 16.39S 135.51E, McArthur River HS, 80 km SW

Borroloola, 13 v 1973 (Upton et al.) 1♂ 2♀ ANC. 15.54S 136.32E, Batten Point, 30 km NNE Borroloola, 18 iv 1976 (Key et al.) 1♀ ANC. 16.47S 135.45E, McArthur R, 14 km SW Cape Crawford, 11 iv 1976 (Key et al.) 1♂ ANC. 16.27S 136.05E, Mimets Crossing, McArthur R, 48 km SW Borroloola, 13 iv 1976 (Key et al.) 1♂ ANC. 4 mi W by S Coolibah HS, 15.34S 130.54E, 25 v 1968 (Mendum) 1♀ ANC. Manbulloo Station, Katherine, 19 vii 1929

TABLE 25. Comparison of *Madasumma* species.

Species	Number of file teeth	Area between M and R veins in male	Male	
			M vein as pale	as surrounding membrane
<i>jirranda</i>	102-119 n=11	yellowish	no	no
<i>affinis</i>	104-135 n=20	yellowish	no	yes
<i>kanina</i>	111-117 n=3	yellowish	no	yes
<i>ilima</i>	113 n=1	yellowish	no	yes
<i>choota</i>	116 n=1	yellowish	no	no
<i>loorea</i>	65-71 n=5	brown with pale crossveins	yes	no
<i>maltea</i>	63-72 n=3	brown with pale crossveins	yes	no

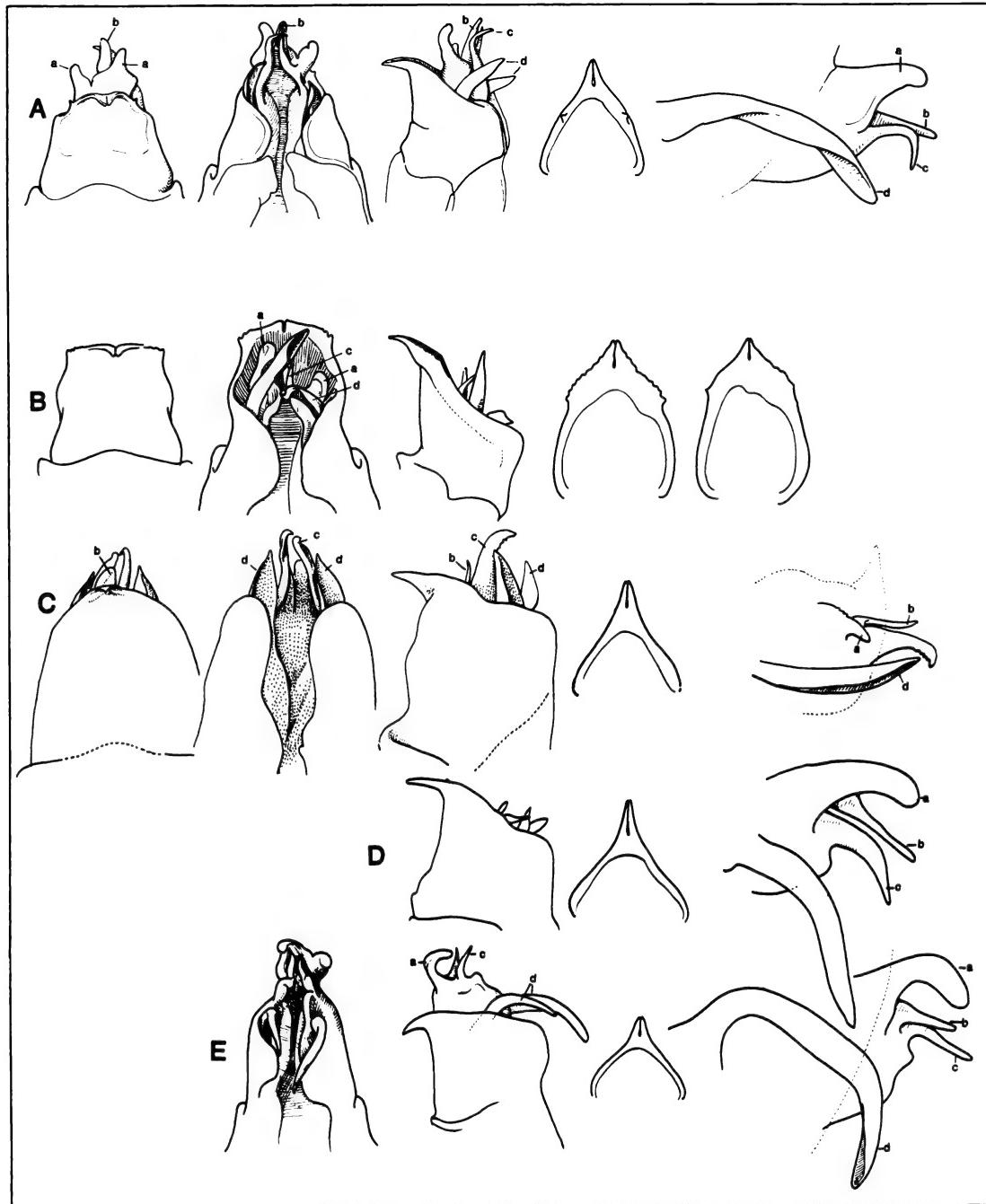


FIG. 247. *Madasumma* male genitalia. NOTE: the endophallic structures can be everted or withdrawn. The small letters will facilitate comparison of structures. A, *affinis* (*kanina* and *jirranda* very similar); B, *ilima*; C, *choota*; D, *maltea*; E, *loorea*.

(Mackerras, Campbell) 1♂ 1♀ ANC. Katherine, 23 vi 1962 20 mi W Vanrook HS, 12 x 1965 (Mesa, Sandulski) 5♀ ANC. 2 (Southcott) 1♀ ANC. 10 mi N Daly Waters, 16 viii 1960 (White) mi W Collinville, 19 ix 1950 (Riek) 1♀ ANC. Silver Plains HS, 1♀ ANC. Elsey Ck, 18 mi E Mataranka, 20 viii 1960 (White) 1♂ Cape York, 30 ix 1961 (Wassell) 1♀ ANC. Beams Brook, 15 mi ANC. Mataranka, 26 iii 1955 (Key) 2♂ 1♀ ANC. QUEENSLAND: SW Burketown, 20 v 1972 (Monteith) 2♂ 1♀ UQC.

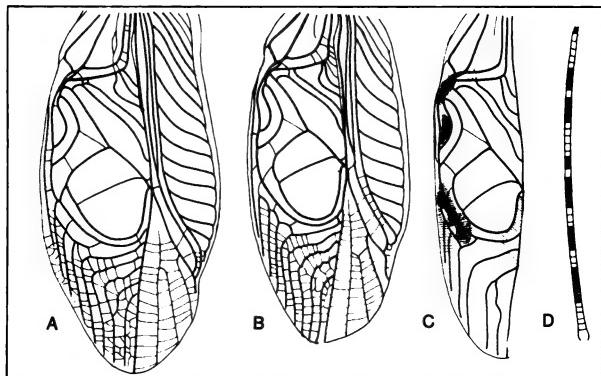


FIG. 248. *Madasumma*. A, *affinis*; B, *ilima*; C, *choota*; D, basal part of antenna of *maltea*.

LISTENING RECORDS. A-100, A-101, A-103, A-107, A-115, A-117, A-166, A-168, A-170, A-176, A-182, A-185, A-192, A-194, A-221, A-224, A-689.

Madasumma kanina n. sp.

RANGE. Northeastern QLD and Cape York.

RECOGNITION. Males: Almost indistinguishable from *M. jirranda* and *M. affinis*. Unlike *M. jirranda* M vein entirely yellow. Harp with 5–7 veins. File with 111–117 teeth (n=3). Hind tibiae reddish-brown and with 6 inner and 6 outer subapical spurs. Genitalia very similar to *M. jirranda* and *M. affinis*. Holotype measurements: Body length 19 mm, with FW's 24 mm; femur III 9.5 mm; tibia III 9 mm; cerci 8 mm. File with 111 teeth.

HOLOTYPE. ♂, A-253, Karumba, on Gulf of Carpentaria, QLD, 7 x 1968, ANC.

SONG. Fig. 246. Loud trills with irregular breaks. When male starts, he often produces several short trills in rapid succession before producing long ones. Short trills seem to increase in intensity during their course and thus to end more abruptly than they began.

	p/s	kps	°C
A-39	66.0	4.7	29.4
A-47	56.0	—	26
A-483	69.2	4.4	24
A-493	62.6	6.4	27
A-494 n=2	58.3, 60.0	6.8, 6.9	28
A-618 n=2	57.0, 58.0	6.0	27
A-64	54.0	5.1	22*
A-34	64.0	4.0	23*

* Shorter trills.

HABITAT. Shrubbery in wooded areas.

SPECIMENS. Holotype ♂ ANC. A-36 1♂ 1♀ ANC. A-39 1♂ 1♀ ANC. A-40 1♂ 1♀ ANSP.

Madasumma jirranda n. sp.

RANGE. Eastern coastal QLD, Cape York, northern NT.

RECOGNITION. Males: Very similar to *M. affinis* and *M. kanina* including male genitalia. But unlike these two species M vein not entirely yellow but bears at least a fine dark streak along its length. Dorsum of head often solid reddish-brown between a line connecting medial surfaces of eyes and median ocellus. Face mostly pale but with a few small reddish dots, especially at top of frons. File with 102–119 teeth (n=11). Harp with 5–7 veins. Body length ca. 20–25 mm. Holotype measurements: Body length ca. 22 mm; with FW 28 mm; FW length 19 mm; femur III 11.5 mm; tibia III 11 mm; cerci 10 mm. File with 106 teeth.

Females: Coloration very similar to males. Cu₁ vein very pale from end of 1st third to end of wing. Cu₁ with 5 branches; these pale at their origin. Body length ca. 22 mm to end of abdomen and 30 mm to end of ovipositor; ovipositor 11 mm.

HOLOTYPE. ♂, A-16, Black River, along Rt 1 north of Townsville, QLD, 25 vii 1968, ANC.

VARIATION. A male from A-55 (Townsville) is considerably darker than holotype—hind tibiae brown and oblique stripes on femur III much more pronounced. Files varied as follows: A-16 (106, 107, 119 teeth); 18 (102, 106, 107, 114, 115, 117, 118); 55 (116).

SONG. Fig. 246. Trills with pulse rate of 20–30 p/s at 18–29°C.

	p/s	kps	°C
A-16	n=2	22.5, 23.6	4.0, 4.3
A-28	n=2	20.0	3.5, 3.7
A-301		29.2	5.6
A-175	n=2	24.0, 28.0	6.5

HABITAT. Found singing in low shrubby vegetation along rivers or behind beach.

SPECIMENS. Holotype ♂ ANC. A-15 1♀ ANC, 2♂ 1♀ ANSP. A-16 4♂ 6♀ ANC. A-18 4♂ 1♀ ANC. A-55 1♂ UM. Ayr, QLD, 9 ix 1935 (Swazey) 1♀ BISH. Same place, 1921 (Illingworth) 1♂ BISH. Ingham, QLD, 1921 (Illingworth) 1♂ BISH. Doubtful identifications: 16.10S 136.15E, Goose Lagoon, 11 km SW Borroloola, NT, 31 x 1975 (Upton) 2♂ ANC.

***Madasumma ilima* n. sp., Figs. 247B, 248B**

RANGE. Known only from the Broome, WA area.

RECOGNITION. Males: Very similar in appearance to *M. affinis* and *M. kanina*, but male genitalia quite different (Fig. 247B). File of holotype has 113 teeth. Body length to end of HW ca. 25 mm; FW length 17.5–19 mm; femur III length 10.2–11 mm. Two males from near Broome have 87 and 104 file teeth.

HOLOTYPE. ♂, 18.49S 123.17E, 163 km SE by E of Broome, WA, 4 viii 1976 (Common) ANC.

SONG. Not known.

HABITAT. Trees and shrubs.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♂ ANC. 6 km NNW Broome, WA, 23 viii 1976 (Common) 2♂ 1♀ ANC.

***Madasumma choota* n. sp., Figs. 247C, 248C**

RANGE. Type locality on Magnetic Island, QLD.

RECOGNITION. Males: Differs from other members of Affinis Group in genitalia and wing markings (Figs. 247C, 248C). FW's with several pale areas and several dark areas. Pale areas located at bases of veins 1A and 2A, between R and M, and between M and Cu₁ veins; large pale spot behind junction of mirror framing vein and Cu₁ vein. Darker brown areas located in cell between chords 1A and 2A, at junction of diagonal vein and stridulatory vein, between posterior mirror vein and mirror framing vein, medial to mirror framing vein, and along and medial to posterior section of Cu₁ vein. File with 116 file teeth. Outer tympanum about twice as large as inner tympanum. Left leg I slightly smaller regenerated leg which lacks any trace of tympanum. Tibia III with 6 inner and 6 outer subapical spurs. Venter of abdomen mostly pale, but last 3 segments (including subgenital plate) with median brown band. End of subgenital plate with narrow notch. Cerci pale. Genitalia as in Fig. 247C. Body length 24 mm, with wings 29 mm; femur III length 14 mm; tibia III 14 mm; cerci ca. 12 mm.

HOLOTYPE. ♂, A-51, Magnetic Island, QLD, 13 ix 1968, ANC.

SONG. Fig. 246. Succession of 4–5 pulse chirps with pulse rate of 40/s at 22°C, chirps delivered erratically, with maximum rate of 4/s, often 1/s, sometimes more infrequently. One male heard in brush about 6 feet up.

HABITAT. Trees and shrubs.

SPECIMENS. Holotype ♂ ANC.

LOOREA GROUP

The Loorea Group includes two species and differs from the Affinis Group in having strongly banded antennae and in lacking a yellow wing band running between the R and M and between the M and Cu₁ veins; these areas are brownish but possess conspicuous yellowish cross-bands. In females the Cu₁ vein is yellowish only where it branches (in the Affinis Group it is more or less continuously yellow).

loorea

Male genitalia as in Fig. 247E.

malteea

Male genitalia as in Fig. 247D.

***Madasumma loorea* n. sp., Fig. 247E**

RANGE. Northern QLD and northern NT.

RECOGNITION. Males: Generally similar to *M. malteea* but differing in genitalia. File with 65–71 teeth (n=5). Body length 21 mm; with wings 26 mm; femur III 11 mm.

Females: Indistinguishable from *M. malteea* females. Body length to end of HW 25–31 mm; FW length 16–22 mm; femur III 10–12.5 mm; ovipositor 10–11.5 mm; cerci 10–12 mm.

HOLOTYPE. ♂, A-144, East Alligator River, near Oenpelli, NT, 28 ix 1968 ANC.

SONG. Fig. 246. Long continuous trills.

		p/s	kps	°C
A-144		95	6.2	26
A-43	n=2	89, 90	4.6, 4.7	28
A-45		78	4.7	25
A-115		81	4.6	21
A-116		85	4.8	24
A-122	n=2	88, 95	5.5, 5.8	28
A-148		85	—	26
A-221		91	5.1	30
A-258		77	—	21
A-26		77	6.4	26

HABITAT. Trees and shrubs.

SPECIMENS. Holotype ♂ ANC. NORTHERN TERRITORY: 16.28S 136.08E, Bukalara Range, 47 km SSW Borroloola, 23 iv 1976 (Key et al.) 4♂ ANC. 16.28S 136.09E, 46 km SSW Borroloola, 28 x 1975 (Upton) 3♂ 3♀ ANC. Near Borroloola, 29 x 1975 (Upton) 1♀ ANC. 12.17S 133.13E, 18 km NE Oenpelli, 1 vi 1973 (Key) 2♂ ANC. 12.22S 133.01E, 6 km SW by S Oenpelli, 30 v 1973 (Key et al.) 2♂ ANC.

***Madasumma maltea* n. sp., Figs. 247D, 248D**

RANGE. Northern Kimberley region, WA.

RECOGNITION. Males: Very similar to *M. loorea* but differing in male genitalia. File with 63–72 teeth ($n=3$); holotype with 71 teeth. Body length to end of HW's 25–28 mm; FW length 17.5–19 mm; femur III length 10–11 mm; cercal length ca. 11 mm.

Females: Similar to males in color. Cu₁ vein whitish where it branches. Dorsal field with about 13 major longitudinal veins. Body length to end of HW 28–33 mm; FW length 20–23 mm; femur III length 11.5–13 mm; ovipositor 10.7–11.2 mm; cerci ca. 13.5 mm.

HOLOTYPE. ♂, 14.39S 126.57E, Drysdale River, Kimberley district, WA, 18–21 viii 1975 (Common, Upton) ANC.

SONG. Not known.

HABITAT. Bailey and Richards labels indicate they collected this species under bark of tree.

SPECIMENS. Holotype ♂ ANC. 14.39S 126.57E, Drysdale River, Kimberley dist, WA, 18–21 viii 1975 (Common, Upton) 3♂ 3♀ ANC. Prince Regent River Reserve, 15.07S 125.33E, WA, 16 viii 1974 (Bailey, Richards) 1♂ 2♀ ANC.

TAMBORINA n. gen.

TYPE SPECIES. *Madasumma ocellata* (Chopard).

This genus includes seven species and is known only from Queensland and Northern Territory where the species are usually found inhabiting medium to tall trees. The species are difficult to capture because they are both sensitive to light and to motion of the trees on which they are found. Sometimes we found it possible to capture males by climbing trees and waiting for them to sing. Other times we felled the trees on which they were perched and found individuals by searching the foliage. Songs are usually very loud and can be heard from a great distance. Several songs coming from very tall forest trees were never identified but probably belonged to undiscovered members of this genus.

RECOGNITION. The genus is similar to *Madasumma* but differs consistently in the following characters: Body color greyish; body length to end of HW's more than 30 mm; face with strong light and dark transverse bands (Fig. 253A–G); tibiae usually

TABLE 26. Comparison of *Tamborina* species.

Species	Range	Number of file teeth	Tip of epiphallus (Fig. 252)	Abdominal sternites
<i>ocellata</i>	northeastern QLD	64–86 n=6	broad	gray or brown
<i>wypanda</i>	northeastern QLD	86 n=1	moderately broad	gray or brown
<i>manilla</i>	northeastern QLD	91 n=1	broad	gray or brown
<i>australis</i>	southeastern QLD	138 n=1	narrow	gray or brown
<i>imurana</i>	southeastern QLD	106 n=1	narrow	banded with black
<i>entrea</i>	NT	95 n=1	narrow	banded with black
<i>pirra</i>	western WA	112, 114 n=2	narrow	banded with black

dark, reddish-brown; pronotum without pale stripe along shoulders; lateral lobes as dark or darker than disk; outer face of femur III always with strong oblique stripes; shoulder of pronotum always without pale stripe. Lateral margins of FW's without pale stripes. *Tamborina* species are generally larger and darker or greyer in aspect than *Madasumma* species.

OCELLATA GROUP

Distal extremity of epiphallus broad with nearly parallel sides (Fig. 252E–G).

AUSTRALIS GROUP

Distal extremity of epiphallus tapering continuously with sides converging (Fig. 252A–D).

OCELLATA GROUP

This group of three species is mainly from eastern Queensland. The group is recognized mainly on the basis of the male epiphallus which is broad at its apex (Fig. 252EFG). In the Australis Group the sides taper continuously (Fig. 252A–D). The three species in this group can be separated as follows:

ocellata

1. Pale band below eye crosses face.
2. Phallic processes symmetrical.
3. Structure c bent downwards, not rake-like (Fig. 252E)
4. Face banded as in Fig. 253D.

wypanda

1. Pale band below eye interrupted at midline.
2. Phallic processes symmetrical.

TABLE 27. Song characteristics of species presumed to belong to either *Madasumma* or *Tamborina* but which were not collected.

	Pulse rate p/s	Chirp rate ch/s	Chirp length	kps	°C temp
A-221	123		trill		6.3 30
A-175	114		trill		5.2 30
A-27	68		trill		2.1 24
A-27	60		trill		2.6 24
A-27	75		trill		2.1 24
A-27	68		trill		2.1 24
A-31	52		trill		3.0 21
A-41	46		trill		2.9 21
A-45	53		trill		2.9 25
A-26	36	0.3/s	18 p	3.5	32
A-26	37		24 p	3.6	32
A-46	95	3/2 s	27–36 p	3.9	22
A-46	89				22
A-26	98	10	5–7 p	4.7	24
A-122	68.3	2.9	18 p	5.9	28
A-758	50	3	10–15 p	4.8	19

3. Process c rake-like (Fig. 252G).

4. Face banded as in Fig. 253F.

manilla

1. Pale band below eye interrupted at midline.
2. Phallic processes asymmetrical.
3. Process c asymmetrical (Fig. 252F).
4. Face banded as in Fig. 253G.

Tamborina ocellata (Chopard), Figs. 252E, 253EKN

Madasumma ocellata Chopard 1951: 493. Holotype ♂, Almaden, Chillagoe District, QLD, 1934 (W. D. Campbell) SAM. Type examined.

RANGE. Northern QLD, northern NT.

RECOGNITION. Males: Somewhat mottled grey-brown. Dorsum of head brownish, almost black anteriorly to medial margins of eyes and back of median ocellus. Face banded as in Fig. 253D. Side of head banded, with white longitudinal band behind eye, bordered above and below by broad brown bands, and with narrow horizontal streak which begins on face and runs below eyes onto cheek. Labrum and clypeus mostly pale. Lateral lobes brown, sometimes with small pale spots darker than disk. Disk mottled light and dark brown; slightly lighter along shoulders. Harp with about 7 veins. File with 64–86 teeth (n=6). Femora I and II strongly banded (Fig. 253HJ); tips of front knees pale. Tibiae and tarsi I and II mostly brown with small pale spot at

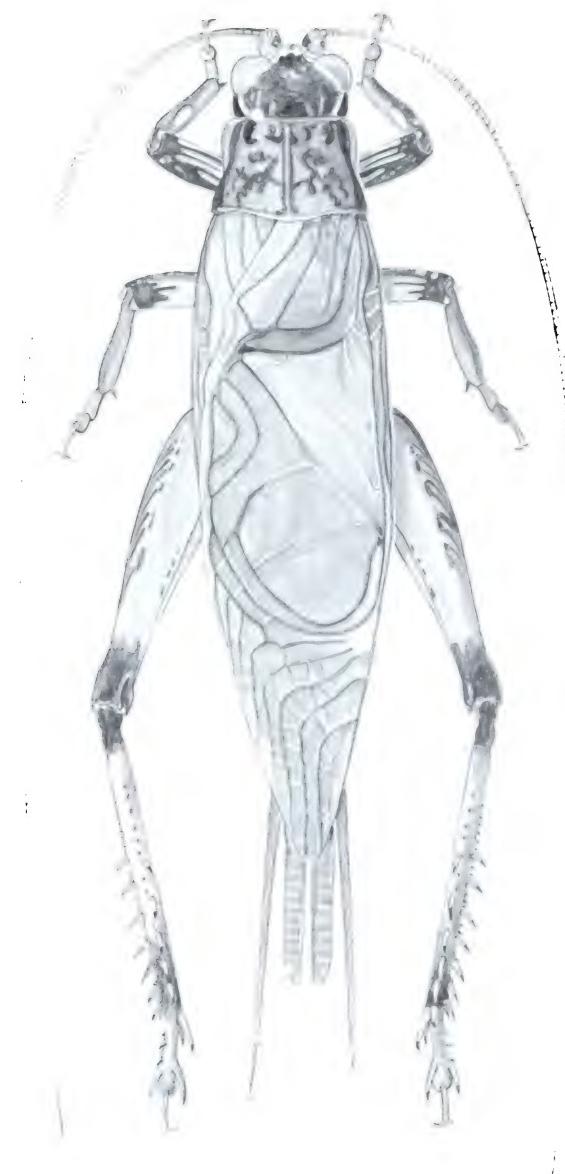
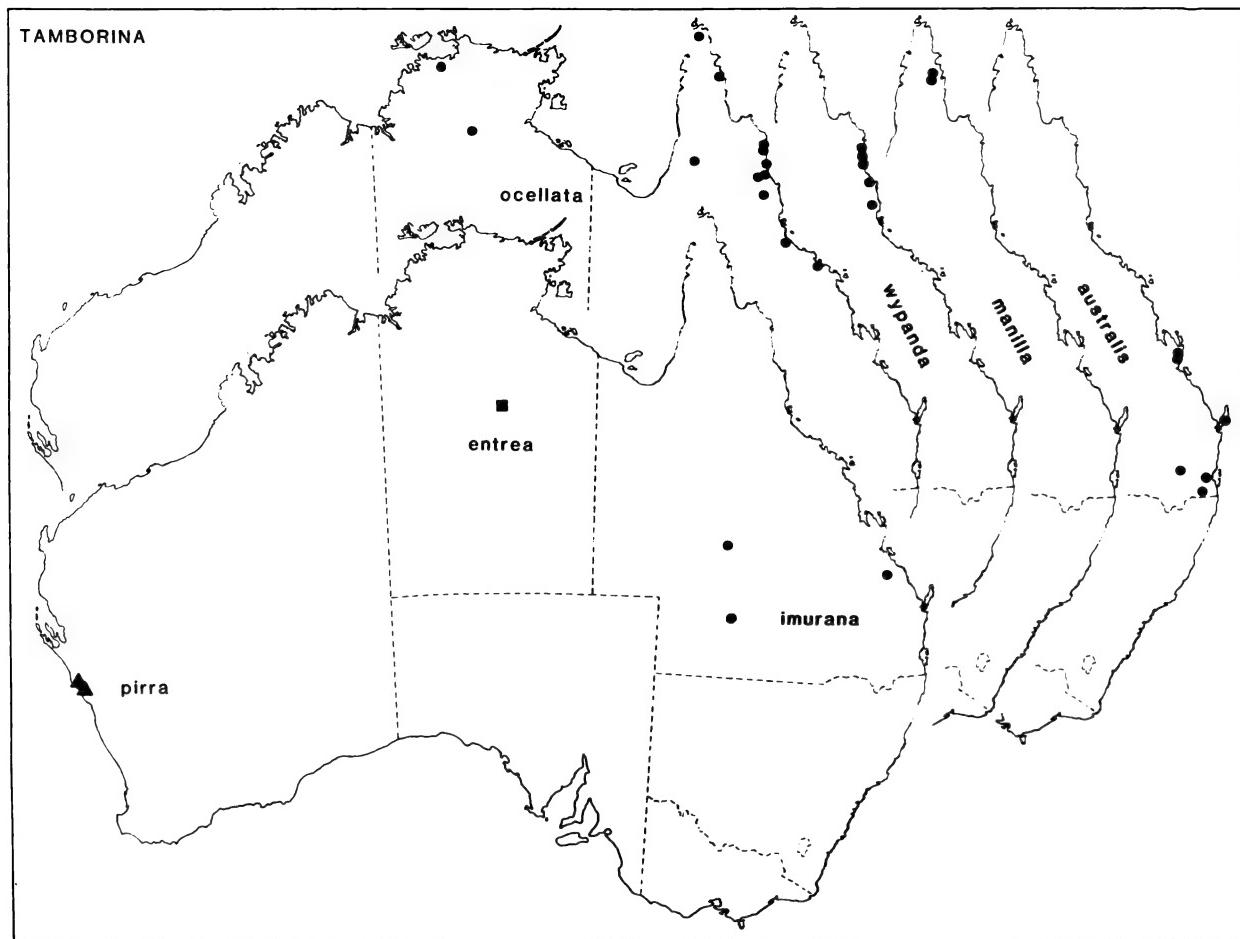


FIG. 249. *Tamborina ocellata*.

top edge just below knee. Venter of abdomen greyish or brownish, without black. Genitalia as in Fig. 252E. Body length ca. 27 mm, with FW ca. 38 mm; femur III ca. 15 mm; tibia III ca. 14 mm; cerci ca. 17 mm.

Females: These females were not associated with singing males, hence their identity remains in doubt. Coloration like males. Cu₁ vein whitish

FIG. 250. *Tamborina* distributions.

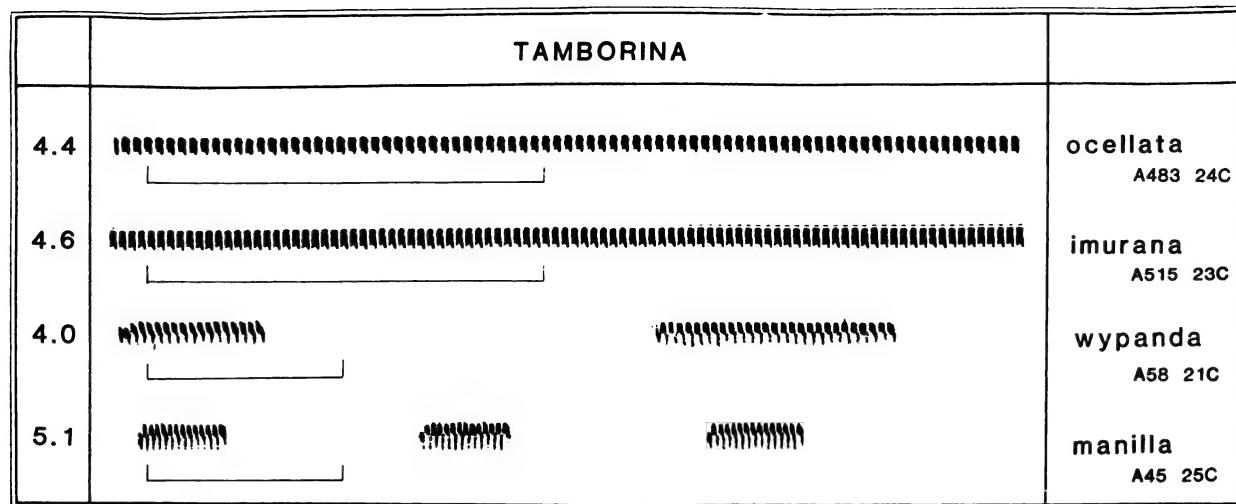
where it forms branches. The wing membrane between branching points often darkly pigmented. Main longitudinal veins on dorsal field dark brown to black, most crossveins whitish. Major veins on lateral field brown or reddish, crossveins pale. Sc vein with 7–8 visible branching points. Cu₁ vein with 4–5 branching veins. Cu₂ vein has 3 visible branching points. Dorsal field of FW with 11–12 major longitudinal veins (3 are branches of Cu₂ vein, 4–5 are branches of Cu₁ vein. At any one level there are as many as 7 major longitudinal veins (excluding Cu₁, M, and R veins). Tibia III with 5–6 outer and 6 inner subapical spurs. HW's extending beyond ovipositor. Body length to end of HW's ca. 39 mm; FW length 26, 27 mm; femur III length 13.2, 15.2 mm; ovipositor 13.0, 15.2 mm; cerci 16.3, 17.3 mm.

VARIATION. A male from A-137 has 8 harp veins and 64 file teeth. A male from Claudie River, QLD, has 77 teeth. A male from Jardine River, QLD, has 86 teeth.

SONG. Fig. 251. Low-pitched loud trill with brief breaks at irregular intervals.

	p/s	kps	°C
A-33	60	3.9	21
A-34	65	4.0	23
A-37	54	3.9	19
A-493	63	6.4	27

HABITAT. Males sing at night generally from foliage of trees and are usually inaccessible because they leap or fly upon even slight disturbance.

FIG. 251. *Tamborina* songs. Scale = 0.5 s.

SPECIMENS. Holotype ♂ SAM. A-32 1♂ UM. A-137 1♂ ANC. QUEENSLAND: 17.14S 145.11E, Stannary Hills, 11 km SW of Mutchilba, 26 v 1977 (Common, Edwards) 1♂ ANC. Cooktown, 23 v 1976 (Britton) 1♂ ANC. Jardine R., Cape York, 15 vi 1969 (Monteith) 2♂ uqc. Claudie River, 1♂ ANC. 90 mi SW Dunbar, 11 x 1965 (Mesa, Sand) 1♂ ANC. Mary Creek, 16.33S 145.12E, 4 xii 1968 (Britton, Misko) 1♂ ANC. 35 mi NW Bowen, 2 x 1950 (Riek) 1♀ ANC. NORTHERN TERRITORY: 15.05S 133.07E, Elsey Ck, 19 km SSE Mataranka, 15 x 1972 (Upton) 1♀ ANC.

Tamborina wypanda n. sp., Figs. 252G, 253F

RANGE. Northern Cape York, QLD.

RECOGNITION. Males: Very similar to *T. ocellata*—but differing in song. Face as in Fig. 253F. Side of head not dark brown as in *T. australis*. Forelegs similar to *T. ocellata*. Harp with 8 veins. File with 86 file teeth. Genitalia as in Fig. 252G. Body length ca. 26 mm; with wings ca. 35 mm; femur III 14 mm.

HOLOTYPE. ♂, A-58. Barron River, along main highway, north of Cairns, QLD, 2 ix 1968, ANC.

SONG. Fig. 251. Succession of loud chirps delivered in pairs.

HABITAT. Trees in open savanna and river courses.

SPECIMENS. Holotype ♂ ANC.

Tamborina manilla n. sp., Figs. 252F, 253GP

RANGE. Northern Cape York, QLD.

RECOGNITION. Large reddish-brown male. Generally similar to *T. ocellata* but differing as follows: Top of head with black mark between eyes and immediately behind ocelli; without a pale Y-shaped line within dark area. Eyes banded (may not be visible in dried specimens) as follows: Narrow black band across top in side view, broad grey band below this extending to middle of eye; bottom half black again. Face as in Fig. 253G. Lateral lobes almost uniformly brown. Disk mottled light and dark rusty brown. Forewings somewhat similar to *T. ocellata*. With 91 file teeth. Harp with 8 veins. Legs I and II as in *T. ocellata*. Internal tympanum somewhat larger than external tympanum. Hind knees black only on crescents. Tibia III with 8 very short subapical spurs (Fig. 253P). Cerci pale brown. Body length 27 mm; with wings ca. 34 mm; femur III 15 mm; tibia III 13 mm.

HOLOTYPE. ♂, A-44, Wenlock River, on road to Iron Range, 73 miles north of Coen, QLD, 10 viii 1968, ANC.

SONG. Fig. 251. Loud chirp pitched at 4.5 to 5.3 kps and containing 11–16 pulses/chirp. Holotype at Wenlock River produced 1.4 chirps per second. At

	p/s	interval between chirps of pair		kps	°C
		chirp length			
A-58	45-48	0.6 s	0.7-1.0 s	4.0	20.5
A-59 n=2	44.0, 44.6	0.5, 0.6	0.6	3.9, 4.0	20
A-56	42.0	0.5	—	4.0	21
A-37	44.0	0.6	0.5	4.7	24
A-34	48.0	0.5-0.6	0.5	3.9	24

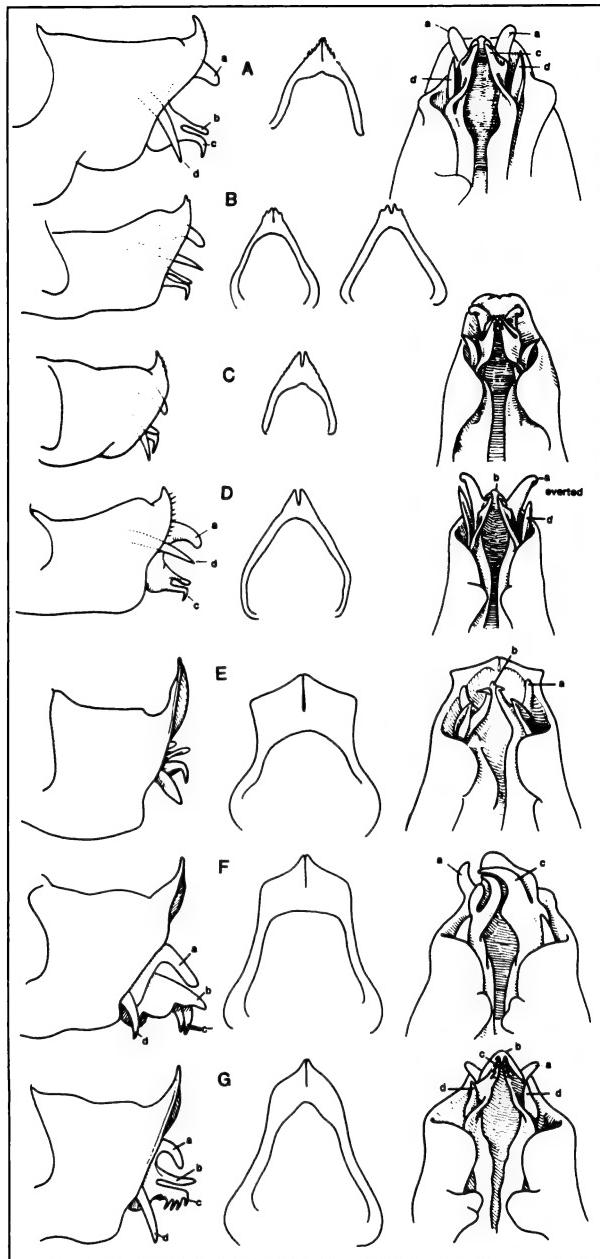


FIG. 252. *Tamborina* male genitalia (lateral, rear, and ventral views left to right). A, *imurana* holotype; B, *pirra*, left rear view (Drummond Cove), right rear view (holotype); C, *australis* Dunwich QLD; D, *entrea* A-107; E, *ocellata* A-32; F, *manilla* A-44; G, *wypanda* holotype.

Iron Range we taped one male chirping at 1.0 chirps/s and two others chirping at roughly 0.5 chirps per second. Last two songs possibly belong to a different species.

	p/s	ch/s	p/ch	kps	°C
A-44	52.6	1.4	11-12	4.5	21
A-45 n=3	56.5-61.5	0.5-1.4	14-16	5.0-5.3	25

HABITAT. Holotype singing about 30-40 feet up in vine-covered tree; captured by felling tree.

SPECIMENS. Holotype ♂ ANC.

AUSTRALIS GROUP

This group of four species extends across the northern states from east to west coasts. The group differs from the Ocellata Group mainly in the distal extremity of the epiphallus which is tapered (Fig. 252A-D). The group includes two subgroups as follows:

Subgroup A (*australis*)

1. Venter of abdomen without transverse black stripes.
2. File with more than 120 teeth.

Subgroup B (*imurana*, *entrea*, *pirra*)

1. Venter of abdomen with transverse black stripes.
2. File with fewer than 120 teeth.

Tamborina australis (Walker), Figs. 252C, 253AM

Platydactylus australis Walker 1869 v. 1: 87. Holotype ♂, Australia, from Macgillivray's collection, BM. Transferred to *Madasumma* by Chopard 1951: 493. Type examined.

RANGE. Southeastern QLD.

RECOGNITION. Males: Body color light brown. Dorsum of head and pronotum rusty brown. Occiput with 2 larger pale spots and one small pale spot in between on median line. Back of eyes with prominent white pale bands as in Fig. 253A. Face very strongly banded as in Fig. 253A. Lateral lobes of pronotum brown, slightly darker and more uniform in color than disk. FW's generally similar to other *Tamborina* species with dark mark (1 mm diameter) at junction of stridulatory vein and diagonal vein. Femur III similar to *T. ocellata*. Tibia III with 5 outer and 6 inner subapical spurs. Cerci light brown. Genitalia as in Fig. 252C. Body length ca. 22 mm; with wings ca. 29 mm; femur III ca. 12 mm; tibia III ca. 11 mm; cerci ca. 13 mm. File: ca. 138 teeth.

Females: Body color chocolate brown. Face dark brown, with prominent pale band across face beneath eyes and antennal sockets (Fig. 253A). Back of head with pale streak from back of eye to pronotum, slanting slightly medially rearwards. Pronotum

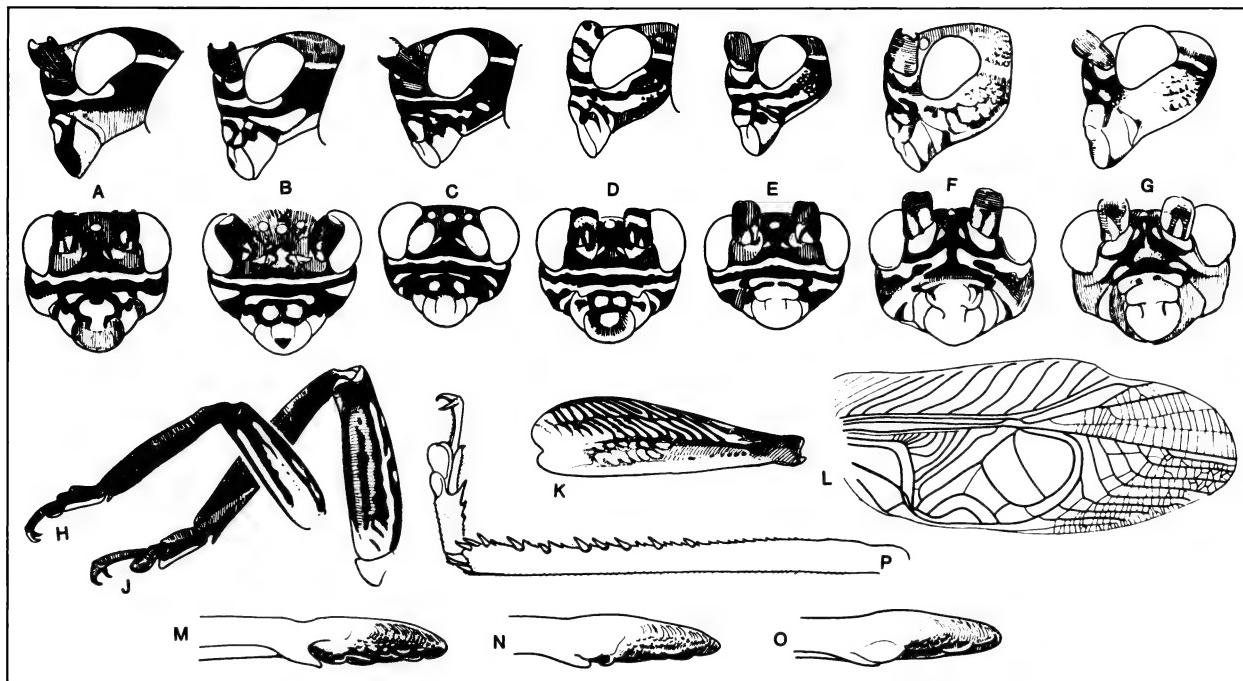


FIG. 253. *Tamborina*. A–G side and front of head: A, *australis* Yeppoon QLD; B, *imurana* Quilpie QLD; C, *pirra* paratype; D, *ocellata* Mutchilba QLD; E, *entrea* holotype; F, *wypanda* A–58; G, *manilla* holotype: H, *entrea* leg II outer; J, *ocellata* leg II outer; K, *ocellata* femur III outer; L, *australis* FW Yeppoon QLD; M, *australis* ovipositor, Gatton QLD; N, *ocellata* ovipositor, Bowen QLD; O, *imurana* ovipositor, Longreach QLD; P, *manilla* hind tibia and tarsus.

brown, without color change between disk and lateral lobes. Pronotal length 0.81 times greatest width. Pronotum not narrowing strongly anteriorly. FW's brown, veins darker than surrounding membrane, but branching veins of Cu₁ pale where they join Cu₁ vein, causing lateral margins of wings to have about four pale marks; these markings not very conspicuous in female from Gatton, QLD, but conspicuous in female from Mt. Tamborine, QLD. Legs almost uniformly brown. Tibia III with 5 inner and 5 outer subapical spurs. No spines between last two subapical spurs, with 2–3 spines between other adjacent subapical spurs. Ovipositor shorter than femur III. Body length ca. 23 mm, ca. 33 mm to end of ovipositor; femur III ca. 14 mm; tibia III ca. 13 mm; ovipositor ca. 11.5 mm. Femur III relatively broad, length about 3.6 times greatest width. Ovipositor as in Fig. 253M.

SONG. Not known.

HABITAT. Trees along water courses and forests.

SPECIMENS. Holotype ♂ BM. QUEENSLAND: Yeppoon, 2 ii 1965 (Common) 1♂ ANC. Dunwich, 1 iv (Brookfield) 1♂ ANC.

Mt Tamborine, 1800 ft, iv 1943 (Tindale) 1♀ ANC. Gatton, 5 x 1951 (Southern) 1♀ ANC. 24.58S 153.19E, Orchid Beach Resort, Fraser Island, 15 vi 1977 (Key) 1♀ ANC. Palm Park, 3.5 mi ESE Byfield, 24 v 1969 (Campbell, Jealous) 1♀ ANC.

Tamborina imurana n. sp., Figs. 252A, 253BO

RANGE. Southern half of QLD.

RECOGNITION. Males: Similar to *T. ocellata* but differing as follows: Face with strong dark cross-bands (as in *T. australis*). Side of head mostly dark reddish-brown. File with 106, 107 teeth. Venter of abdomen mostly dark brown. Subgenital plate notched at end. Femur III with row of dark spots in middle of bottom third. Genitalia as in Fig. 252A. Body length 28 mm; with wings 36 mm; femur III 14 mm.

Females: Similar to male in color. Similar to *T. ocellata* but facial banding as in male (Fig. 253B) and venter of abdomen strongly banded with black (grey to brown in *T. ocellata*). Cu₁ vein with 6 branches, Cu₂ with 3 branches. Dorsal field of FW with 12 major veins (excluding Cu₁, Cu₂, R, and M).

Unlike *T. ocellata*, numerous crossveins are dark brown. Body length to end of HW 37 mm; FW length 25.5 mm; femur III length 13.3 mm; ovipositor length 14 mm; cercal length ca. 18 mm.

HOLOTYPE. ♂, A-515, 18 miles north of Monto, on Burnett Hwy, QLD, 22 ii 1969, ANC.

SONG. Fig. 251. Extremely fast, essentially continuous, ringing trill.

	p/s	kps	°C
A-515	82	4.6	23

HABITAT. Two males heard at type locality, both 15–20 feet high in trees; one male captured by sawing down 25–30 foot wattle tree and locating him in it.

SPECIMENS. Holotype ♂ ANC. 10 mi E of Quilpie, QLD, 11 iv 1971 (Monteith) 1♂ UQC. Longreach, QLD, iii 1972 (Davies) 1♀ ANC.

Tamborina entrea n. sp., Figs. 252D, 253EH

RANGE. Type locality in central NT.

RECOGNITION. Males: Dark reddish-brown species. Dorsum of head and basal antennal segments dark reddish-brown with pale transverse stripe connecting lateral ocelli. Eyes grey. Venter of scape nearly black. Side of head as in Fig. 253E. Labial palpi mostly dark—4th and 5th segments mostly dark brown, 3rd segment dark on top and pale on bottom. Lateral pronotal lobes very dark reddish-brown. Disk mottled reddish and dark brown. FW's with 95 teeth and very dark veins. Opaque areas on FW's as in *T. ocellata*. Harp with 5 major and several smaller veins. Femora I and II strongly banded. Tibiae and tarsi dark reddish-brown. Femur III similar to *T. ocellata* but somewhat darker. Venter of abdomen black, except subgenital plate which is pale and notched at end. Cerci pale brown. Genitalia as in Fig. 252D. Body length 23 mm; with wings 32 mm; femur III 11 mm; tibia III 11 mm; cerci 13 mm.

HOLOTYPE. ♂, A-107, 72 miles north of Tennant Creek, NT, 21 ix 1968, ANC.

SONG. Not known.

HABITAT. Eucalyptus trees in open savanna woodland.

SPECIMENS. Holotype ♂ ANC.

Tamborina pirra n. sp., Figs. 252B, 253C

RANGE. Geraldton region of WA.

RECOGNITION. Males: Very similar to *T. entrea* and *T. imurana* but genitalia different (Fig. 252B) and file with 112–114 teeth (holotype with 112 teeth). Face and head markings as in Fig. 253C. Harp with 7–9 veins. Body length to end of FW's 32–33 mm; FW length 22–24 mm; femur III 11–12.5 mm; cerci ca. 19 mm.

HOLOTYPE. ♂, about 11 km N of Geraldton, WA, 7 i 1973 (N. McFarland) ANC.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♂ ANC. Drummond Cove, 7 mi N Geraldton, WA, 29 xi 1972 (McFarland) 1♂ ANC.

HEMIPHONUS GENUS GROUP

RIATINA n. gen.

TYPE SPECIES. *Hemiphonus frontalis* Walker.

This genus of ten species is distributed throughout Australia. Little is known about their habits. Most species have been collected at lights, but others have been collected from under bark and in clusters of dry leaves of eucalyptus. Rice (pers. comm.) informs us that he saw large clusters of individuals of an unidentified species hiding under loose eucalyptus bark. The flattened bodies of the species in this genus suggest a similar habitat for all. The front and middle legs are also unusual; like Gryllotalpinae the legs can make contact with a substrate above the body (Fig. 259T) and are probably fitted for moving about in narrow cracks and burrows.

RECOGNITION. Similar to genus *Hemiphonus* but possessing the following set of characteristics: Body generally flattened dorso-ventrally. Male genitalia more bilaterally symmetrical in top view (Fig. 256). Head relatively broad so there is little narrowing of body from pronotum forward to eyes (Fig. 254). Pronotum relatively much wider than long (in *Hemiphonus* width and length nearly equal) (Fig. 254). Subapical spurs of tibia III confined to distal third of tibia, and distance between spurs less than length of spurs themselves; few or no spines between most distal spurs (Fig. 5E). FW venation variable; in most species mirror incomplete but

FIG. 254. *Riatina frontalis*.

complete in *R. pulkara*. FW veins darker than surrounding membrane. Tibia I with large inner and outer tympana.

The ten species in the genus can be arranged, by male genitalic configuration, into the following groups: Tuberculifrons Group (*frontalis*, *pilkena*); Callosifrons Group (*callosifrons*, *nangkita*); Padiminka Group (*padiminka*, *mundiwindi*); Villosoiceps Group (*villosoiceps*, *brevicauda*); Pulkara Group (*pulkara*, *karralla*).

KEY TO RIATINA SPECIES

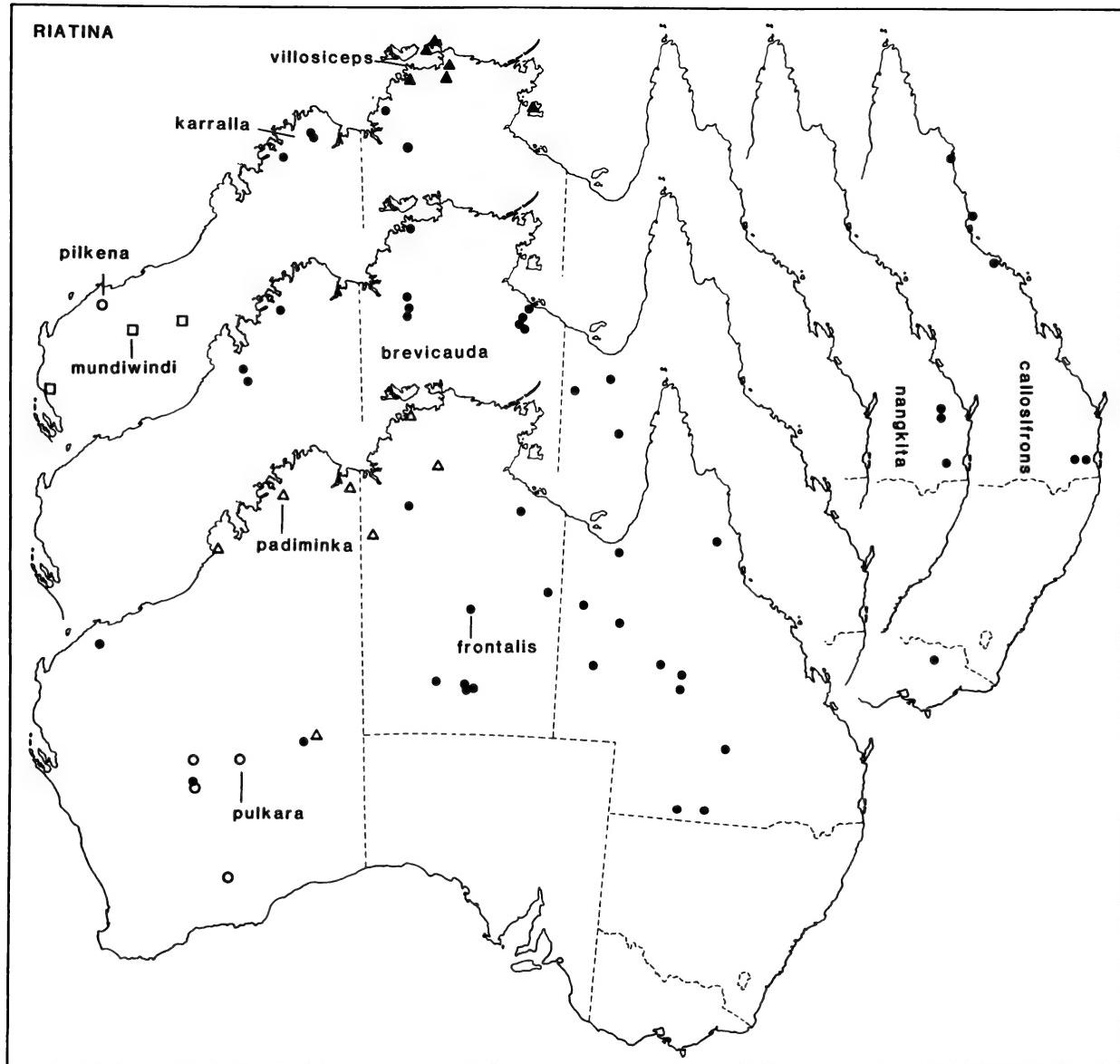
1. Face with at least 6 tubercles on frons (Fig. 259A) *frontalis*
Face with one tubercle (below front of eyes) or without tubercles (Fig. 259B-F) 2
2. Dorsum of rostrum blackish. Lateral lobes blackish 3
Dorsum of rostrum pale brown, brown, or reddish 5
3. Mirror very large (Fig. 258A). Face black and without prominent yellow or white spots (Fig. 257J) (WA) *pulkara*
Mirror small or poorly developed (Fig. 258B-V). Face black or dark brown and with distinct yellowish or whitish spots (Fig. 257CD) (eastern Australia) (Callosifrons Group) 4
4. Femur III with a smoky band on the outer face (Fig. 259X). File with ca. 180 teeth. Genitalia as in Fig. 256N *nangkita*
Femur III without a smoky band. File with ca. 140 teeth. Genitalia as in Fig. 256M *callosifrons*
5. Face with a single tubercle below the front of each eye (Fig. 259BC) *padiminka*
Face without tubercles (Fig. 259DEF) 6
6. Face with at least 6 distinct pale markings (Fig. 257AEF) 7
Face without pale markings or with fewer than 6 indistinct markings (Fig. 257IK) 9
7. Upper lobe of clypeus with distinct pale spots, and frons with 6-8 pale spots (Fig. 257EF). Male FW with distinct mirror. File with more than 140 teeth. Genitalia more as in Fig. 256GH 8
Upper lobe of clypeus without pale spots, and frons with 6 pale spots (Fig. 257A). Male FW without mirror (Fig. 258UV). File with fewer than 140 teeth. Genitalia more as in Fig. 256C *pilkena*
8. Facial markings more as in Fig. 257E. File with 196-205 teeth *villosoiceps*
Facial markings more as in Fig. 257F. File with 151-168 teeth *brevicauda*
9. Mirror well-developed and once divided (Fig. 258B). Face very pale and rather high. Genitalia as in Fig. 256L *karralla*
Mirror small or undeveloped (Fig. 258RS). Face flatter. Genitalia as in Fig. 256F *mundiwindi*

FRONTALIS GROUP

This group includes the species *R. frontalis* and *R. pilkena*. *R. pilkena* lacks facial tubercles but has the male genitalia very similar to *R. frontalis*. In facial characteristics, *R. pilkena* is similar to the Villosoiceps Group, but the genitalia are quite different. Females of *R. pilkena* are likely to be confused with *R. villosoiceps*, but facial markings are slightly different (see figures).

frontalis

1. Face brown to black.

FIG. 255. *Riatina* distributions.

2. Facial tubercles lighter than surrounding area.
3. Mirror present.

pilkara

1. Face rusty red.
2. Without facial tubercles. Frons with 6 pale spots.
3. Mirror absent.

***Riatina frontalis* (Walker), Figs. 254, 256AB, 257B, 258GHJ, 259AGHVY**

Laurepa frontalis Walker 1869: 99. Holotype ♂, Northern Aus-

tralia (presented to BM by J. R. Elsey) BM. Transferred to *Hemiphonus* by Chopard 1951: 500. Type examined. *Hemiphonus tuberculifrons* Chopard 1925: 49. Holotype ♀, Kimberley district, NW Australia (Mjöberg) sm. Type examined. NEW SYNONYM.

RANGE. Widespread through the interiors of WA, NT, and QLD.

RECOGNITION. Both sexes: Face brown to black with about 8 white or yellow tubercles (Fig. 257B). Frons pointed (Fig. 259GH). Lateral pronotal lobes

TABLE 28. Comparison of *Riatina* species.

Species	Number file teeth	Background facial color	Facial tubercles	Facial markings	Frons profile (top view)	Dorsum of rostrum blackish
<i>frontalis</i>	50–175 n=6	brown to black	with more than 6 pale tubercles	tubercles pale	pointed	sometimes
<i>pilkena</i>	128, 129 n=2	rusty red	without tubercles	frons with 6 pale spots	truncated to rounded	no
<i>nangkita</i>	179, 180 n=2	black	sometimes one low one beneath each eye	with 6 or more yellow spots	truncated	yes
<i>callosifrons</i>	ca. 140 n=2	dark brown to black	usually no tubercles	frons with 4–8 white or pale spots	rounded to truncated	yes
<i>mundiwindi</i>	128–181 n=5	reddish brown	no tubercles	frons with several indistinct pale spots	truncated	no
<i>padiminka</i>	155–204 n=7	rusty red to black	one tubercle beneath each eye	frons without pale spots	rounded to truncated	no
<i>villosiceps</i>	196–205 n=4	brown to black	no tubercles	frons with 8 or more pale spots	largely truncated	no
<i>brevicauda</i>	151–168 n=5	pale brown to brown	no tubercles	frons with 6 pale spots	truncated	no
<i>pulkara</i>	88–93	dark brown to black	no tubercles	frons without pale spots	slightly pointed or truncated	yes
<i>karralla</i>	71–85 n=6	pale brown	no tubercles	frons without pale spots	truncated	no

distinctly darker than disk. FW pale brown with dark brown veins. FW venation as in Fig. 258GHJ. File with 150–173 teeth (n=5). Genitalia as in Fig. 256AB. Body length ca. 25 mm; forewing length ca. 19 mm; femur III length ca. 9 mm; tibia III length ca. 7.5 mm; cercal length ca. 16 mm.

Females: Similar to males in color. Body length to end of HW 27–31 mm; FW length 17–21 mm; femur III 9–10 mm; ovipositor length 7.5–9.5 mm.

VARIATION. File counts vary as follows: 150 teeth (Wittenburro, SW QLD); 164 (Alice Springs); 163 (Kathleen Valley, WA); 173 (Augathella, QLD). Vicinity of Millstream HS, WA (177–217).

SONG. Not known.

HABITAT. Probably hides mainly in crevices under bark, hollow branches, and clusters of dry leaves in dry eucalyptus woodlands and scrub.

SPECIMENS. Holotype ♂ BM A-72 1♂ ANC. WESTERN AUSTRALIA: Kathleen Valley, 1963 (T. Moriarty) 1♂ 1♀ WAM. Warburton Mission, 3 ii 1967 (White) 1♀ ANC. 1 km NE Millstream HS, 21.35S 117.04E, 23 iv 1971 (Key et al.) 1♂ 1♀ ANC. 0.5 km SSW Millstream HS, 27 x 1970 (Upton, Feehan) 1♂ 2♀ ANC. 15 km E Millstream HS, 20 x 1970 (Upton, Feehan) 8♂ 1♀ ANC. NORTHERN TERRITORY: Alice Springs, xii, 1♂ 1♀ SAM. Same place, vi, 1♂ ANC. Wigley Waterhole, 5 mi N Alice Springs, 16 ii 1966 (Britton et al.) 3♂ ANC. Standley Chasm, 26 mi W Alice Springs, 9 ii 1966 (Britton et al.) 2♂ ANC. Surprise Ck, 45 km SW Borroloola, 5 xi 1975 (Upton) 1♂ ANC. Wauchope, 21 iii 1955 (Key) 1♂ ANC. 3 mi NE Gosses Bluff, 23.48S 132.21E, 8 iv 1969 (Pelz) 2♂ ANC. 2 mi ENE Victoria River Downs, 16.24S 131.02E, 31 v 1969 (Mendum) 1♀ ANC. QUEENSLAND: 3 mi NW Augathella, 26 xii 1961 (White) 1♂ ANC. Wittenburro, 30 mi N Hungerford, vi 1967 (Rowlands) 1♂ ANC. Flinders River, 25 mi SW Normanton, 26 v 1972 (Monteith) 1♂ UQC. Dimbulah, 12 i 1961 (Teseh) 1♀ UQC. 10 mi S Winton, 14 v 1972 (Monteith) 1♂ UQC. Darr River, 31 km NW by N Longreach, 10 v 1973 (Upton) 1♂ ANC. 22.45S 139.46E, 0.5 km SE Stockport HS, near Boulia, 8 iv 1976 (Key et al.) 1♀ ANC.

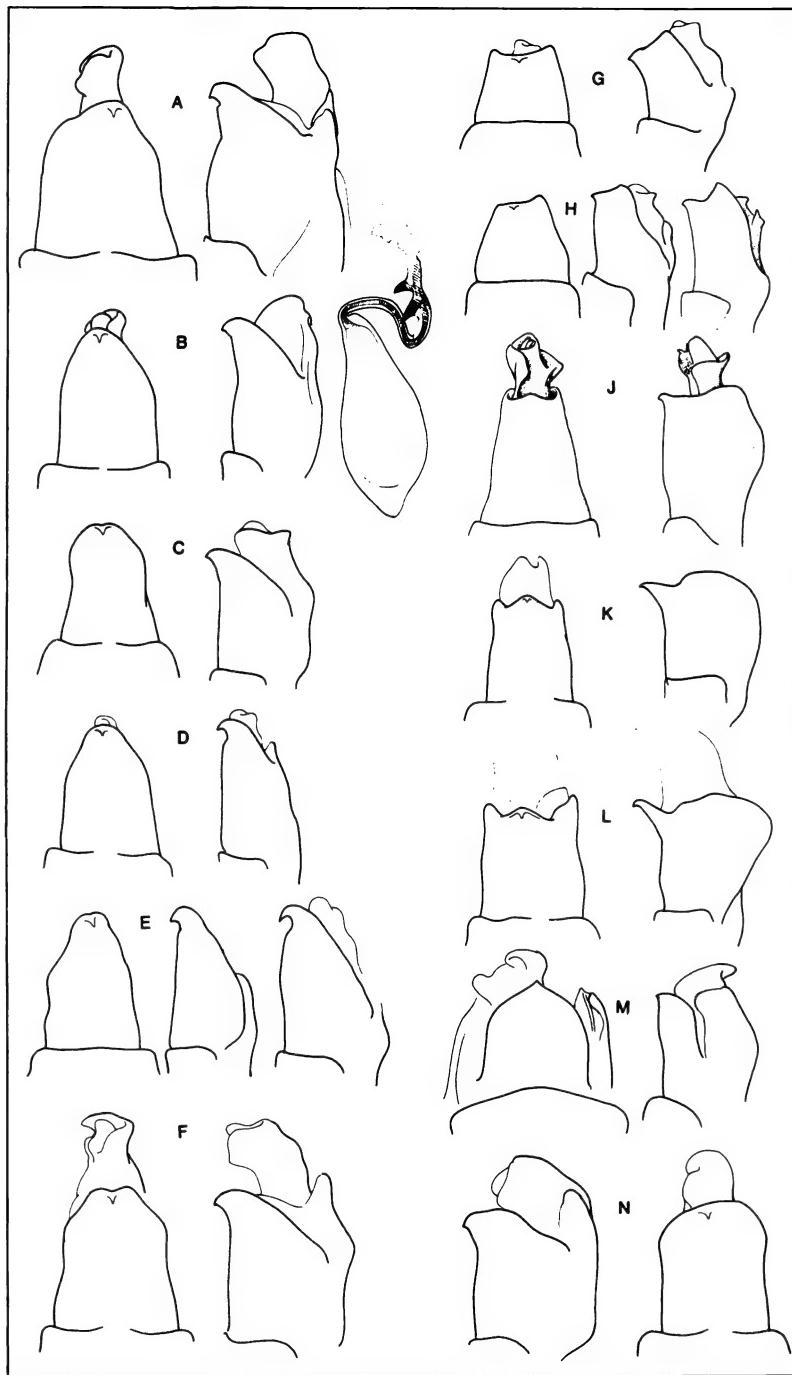


FIG. 256. *Riatina* male genitalia (dorsal and lateral views). A, *frontalis* Avon Downs; B, *frontalis* near Millstream HS WA, with spermatophore; C, *pilkena* Millstream HS; D, *padiminka* Darwin; E, *padiminka*, near Mt Sandford (left and middle), near Broome (right); F, *mundiwindi* holotype; G, *villosiceps* near Mt Cahill; H, *brevicauda*; J, *pulkara*; K, *karralla* Carson Escarpment; L, *karralla* Prince Regent Reserve; M, *callosifrons* Glenrown VIC; N, *nangkita* holotype.

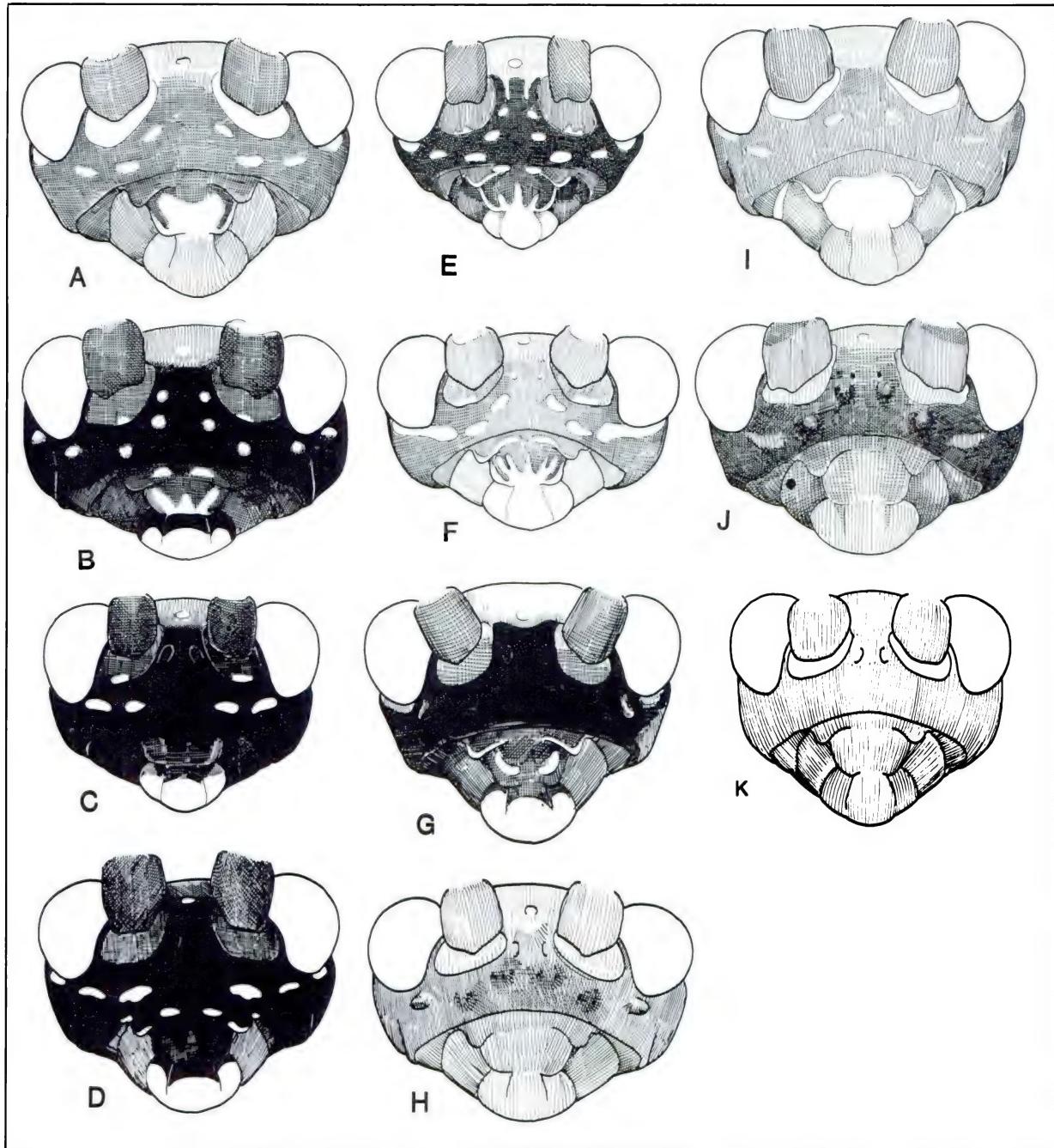


FIG. 257. *Riatina* faces. A, *pikena*; B, *frontalis*; C, *callosifrons*; D, *nangkita*; E, *vilosiceps*; F, *brevicauda*; G, *padiminka* Darwin; H, *padiminka* holotype; I, *mundiwinda* holotype; J, *pulkara* Cosmo Newberry; K, *karralla*.

Longreach, iii 1972 (Davies) 1♂ ANC. 20.18S 139.03E, 20 km ESE Yelvertoft HS, near Camooweal, 9 iv 1976 (Key et al.) 1♂ ANC. 5 km W Cloncurry, 4 x 1977 (Rentz, White) 1♀ ANC. 2 mi SE Mary Kathleen, 21 iv 1962 (Key, Corby) 1♂ ANC. Gilruth Plains Sta, E of Cunnamulla, 8 i 1964 (Vestjens) 1♀ ANC.

***Riatina pilkena* n. sp., Figs. 256C, 257A, 258UV, 259M**

RANGE. Vicinity of Millstream HS, WA.

RECOGNITION. Males: FW without any trace of

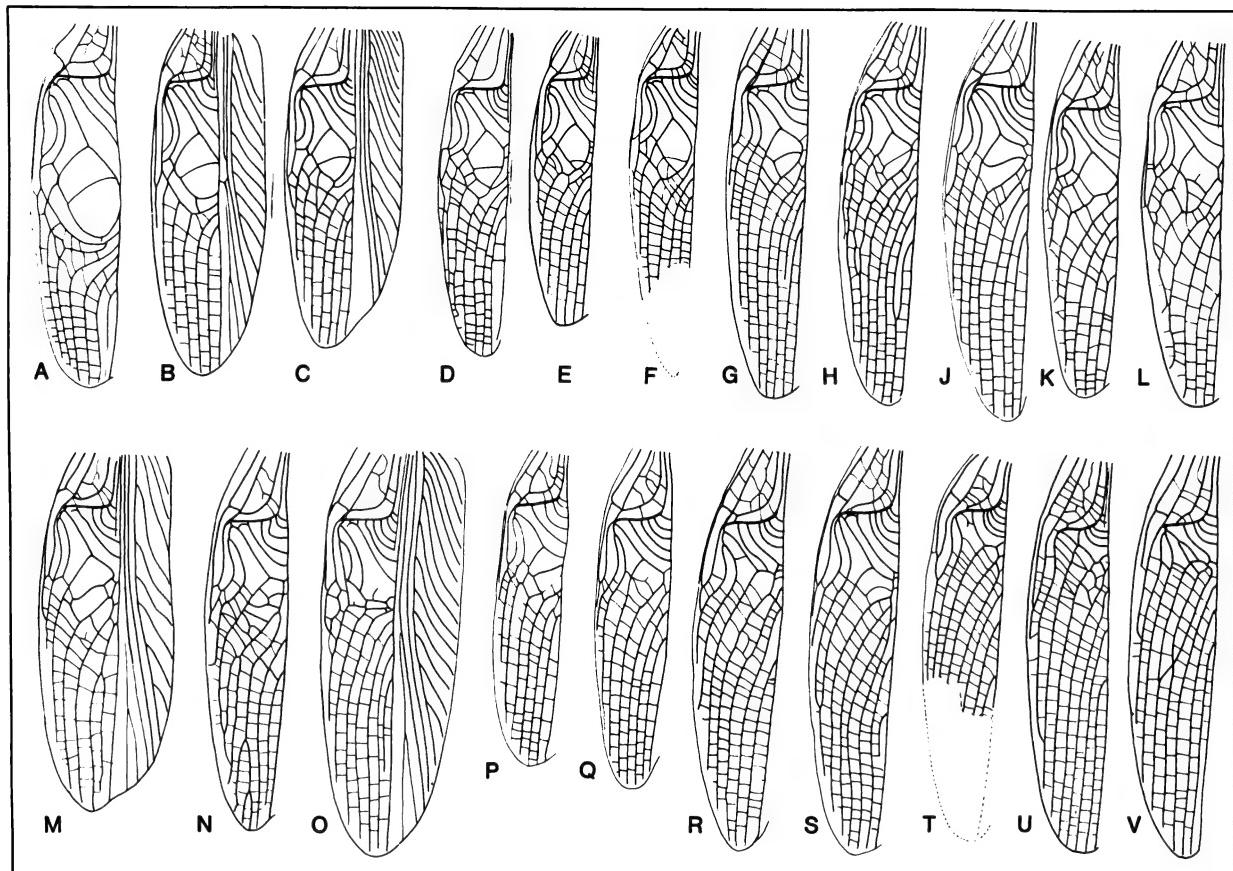


FIG. 258. *Riatina* male FW's. A, *pulkara* Lake Violet; B, *karralla* Carson Escarp.; C, *villosiceps* near Mt Cahill; D, *vilosiceps* holotype; E, *brevicauda* Victoria River Downs; F, *brevicauda* Cloncurry; G, *frontalis* Millstream HS; H, *frontalis* Augathella QLD; J, *frontalis* Avon Downs; K, *callosifrons* Ayr QLD; L, *callosifrons* Glenrowan VIC; M, *nangkita* holotype; N, *nangkita* Greenband QLD; O, *padiminka*, Prince Regent River Reserve; P, *padiminka* Tindal NT; Q, *padiminka* Warburton Range; R, *mundiwindi* Gascoyne R; S, *mundiwindi* Nullagine WA; T, *mundiwindi* Hammersley Ra; U, *pilkena* Millstream HS WA; V, *pilkena* near Millstream HS WA.

a mirror (Fig. 258UV). Stridulum short, type with 129 teeth. Face rusty red with 6 yellowish spots on frons and another at lower back margin of each eye (Fig. 257A). Lower lobe of clypeus very pale. Dorsum of rostrum also rusty red and front of rostrum truncated. Genitalia very similar to *R. frontalis* (Fig. 256C). Body length to end of HW 26.0, 26.5 mm; FW length 16.7, 17.5 mm; femur III length 8.3–9.0 mm; cercal length ca. 14 mm.

Females: Very similar to male in color. Body length to end of HW 30.5 mm; FW length 20.3 mm; femur III length 11.5 mm; ovipositor length 11 mm.

HOLOTYPE. ♂, 5 km SE Millstream HS, 21.37S 117.06E, WA, 23 iv 1971 (Key, Upton) ANC.

SONG. Not known.

HABITAT. Probably eucalyptus trees in open savanna woodland.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♀ ANC. 1 km NE Millstream HS, WA, 23 iv 1971 (Key et al.) 1♂ ANC.

CALLOSIFRONS GROUP

The two species in this group are blackish on the dorsum of the rostrum. The face is blackish and bears at least four yellow patches. These are not prominent tubercles, but in *R. nangkita* the yellow spot beneath the median margin of the eye is sometimes slightly tuberculate. The front of the rostrum is rounded or truncated in top view (Fig. 259NO).

callosifrons

1. Male genitalia as in Fig. 256M.

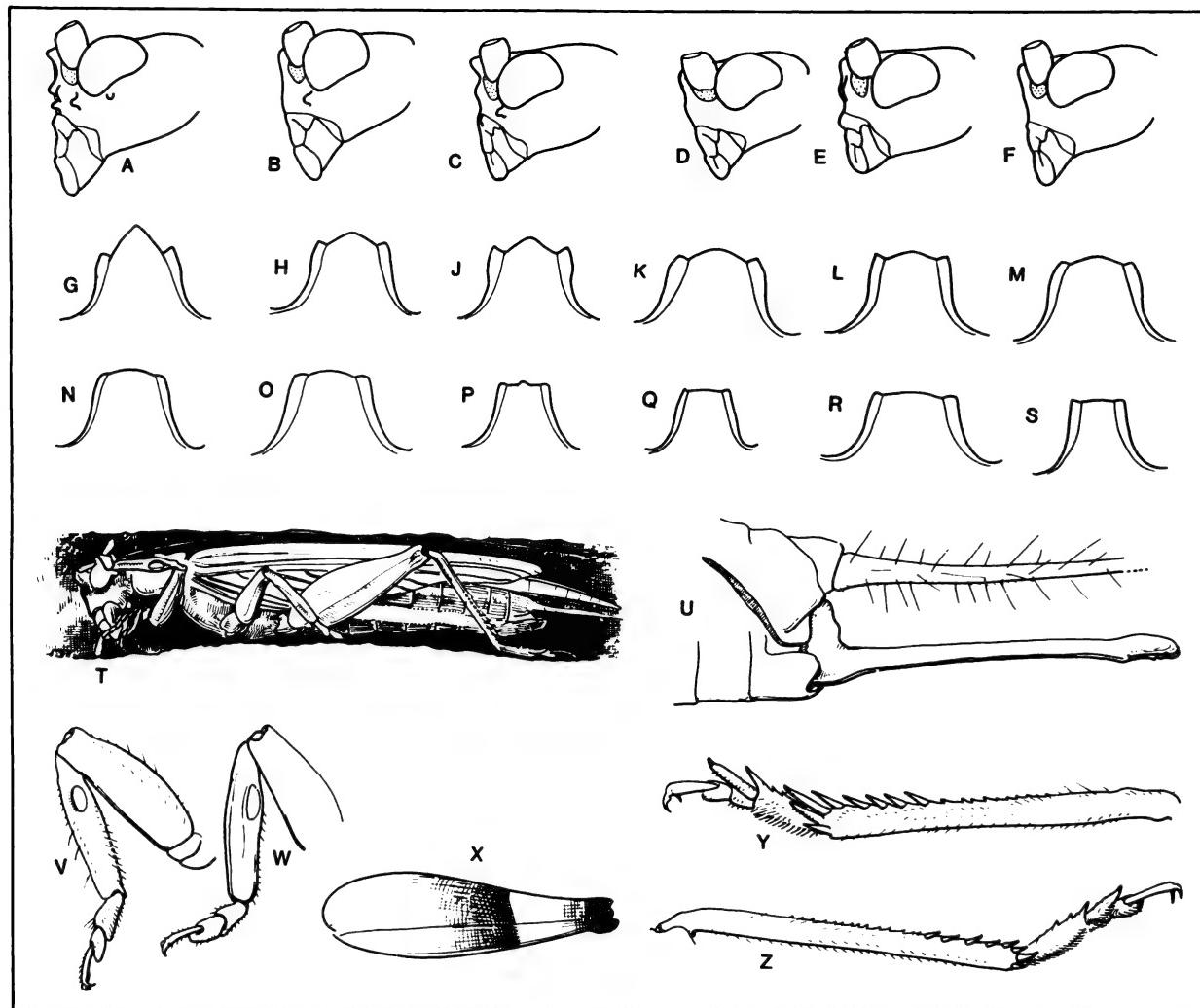


FIG. 259. *Riatina*. A–F, side of head; G–S frons (dorsal view). A, *frontalis*; B, *padiminka* Darwin NT; C, *padiminka* Warburton; D, *villosiceps*; E, *mundiwindi*; F, *pulkara*; G, H, *frontalis*; J, K, *padiminka*; L, *pulkara*; M, *pilkena*; N, *callosifrons*; O, *nangkita*; P, *vilosiceps*; Q, *gracilis*; R, *mundiwindi*; S, *karralla*; T, *padiminka* showing the position of the front leg which may be used against the dorsal surface (based on leg positions of alcoholic specimen). U, *padiminka* ovipositor; V, *frontalis* leg I outer; W, same, inner; X, *nangkita* femur III outer; Y, *frontalis* tibia III inner; Z, same, outer.

2. File with ca. 140 teeth.
 3. Femur III without a broad smoky band as in Fig. 259X.
- nangkita*
1. Male genitalia as in Fig. 256N.
 2. File with ca. 180 teeth.
 3. Femur III usually with a broad smoky band as in Fig. 259X.

Riatina callosifrons (Chopard), Figs. 256M, 257C, 258KL, 259N

Hemiphonus callosifrons Chopard 1925: 49. Holotype ♂, Cooktown, QLD (Mjöberg) sm. Type examined.

RANGE. Eastern Australia, VIC to QLD.

RECOGNITION. Both sexes: Dorsum of rostrum black (as in *R. nangkita*, *R. pulkaris*, and some *R. frontalis*). Face black with yellow spots and yellow labrum (similar to *R. nangkita*). Differs from *R. nangkita* in male genitalia (Fig. 256M), in having fewer file teeth (ca. 140, n=2), and in lacking smoky band on outer face of femur III. Scape very dark. Frons (top view) not pointed, but rounded in some individuals and truncated (Fig. 259N) in others.

Disk of pronotum pale brown, lateral lobes blackish. Dorsum of FW's pale brown to grey with dark veins. FW venation as in Fig. 258KL. Body length 19–24 mm; FW length 15–21 mm; femur III 9–11.5 mm; ovipositor 7.0–9.5 mm.

SONG. Not known.

HABITAT. Collected under bark.

SPECIMENS. Holotype ♂, SM. Glenrowen, VIC, 1♂ 1♀ ANC. 35 mi SE Ayr, QLD, 3 x 1950 (E. F. Riek) 1♂ ANC. Dunk Island, QLD, xii 1932, 1♀ SAM. Ipswich (QLD?), 30 iii 1952 (J. Davis) 1♀ UQC. Brisbane, QLD, 1 ii 1956 (Y. Beri) 1♀ UQC.

Riatina nangkita n. sp., Figs. 256N, 257D, 258MN, 259OX

RANGE. Mountains of southeastern QLD.

RECOGNITION. Males: Only species with hind femora marked with broad smoky band taking up at least central third of femur (Fig. 259X). Band may be indistinct in adults but black in late instar juveniles. Dorsum of head black in front half. Front of rostrum truncated. Face black, but lower half of labrum yellow; black area marked with at least 8 yellow spots (Fig. 257D); the ones bordering eyes may be indistinct. Facial tubercles absent, but yellow spot below median margin of each eye sometimes slightly tuberculate. Side of head black below front half of eye, becoming dark brown or brown toward back of head. Head back of eye usually with yellow streak extending rearwards. Disk of pronotum brown, lighter along shoulders; lateral lobes black below the pale shoulder and brown along bottom. FW venation as in Fig. 258MN. File of holotype with ca. 179 teeth; that of paratype from Greenbank QLD has 180 teeth. Genitalia as in Fig. 256N. Body length to end of HW 25–27 mm; FW length 16–16.5 mm; femur III length 9–10 mm; cercal length ca. 19 mm.

Females: Similar to males in color. Body length to end of HW 28–29 mm; FW length 18–19 mm; femur III length 11–11.5 mm; ovipositor length 8.2–8.8 mm.

HOLOTYPE. ♂, Ban Ban Range, South of Biggenden, QLD, 12 i 1974 (Frauca) ANC.

SONG. Not known.

HABITAT. Frauca specimen labels read: "under bark on tree trunk," and "under eucalypt bark in foothills."

SPECIMENS. Holotype ♂ ANC. 2♀, same data as holotype, ANC.

Greenbank, QLD, 8 i 1963 (T. Brooks) 2♂ BISH. Bluff Range, near Biggenden, QLD, i 1972 (Frauca) 11 last instar juveniles, ANC.

PADIMINKA GROUP

The two species in this group have reddish-brown to dark brown or blackish faces with at most very faint pale markings. One of the species (*padiminka*) bears a single tubercle beneath each eye. Front of frons rounded to truncated. Genitalia similar (Fig. 256DEF). Mirror small, poorly developed, or absent (Fig. 258O–S).

padiminka

1. Face with a single tubercle beneath the front of each eye (Figs. 257GH, 259BC).
2. Genitalia as in Fig. 256DE.

mundiwindi

1. Face without tubercles.
2. Genitalia as in Figs. 257I, 259E.

Riatina padiminka n. sp., Figs. 256DE, 257GH, 258OPQ, 259BCJKTU

RANGE. Eastern WA to northern WA and northwestern NT.

RECOGNITION. Males: This species possesses a single small tubercle below median margin of eye (Fig. 259B). No other species possess this feature. Body color pale, yellowish, head more orange than pronotum. Frons (viewed from above) truncated. Face reddish-brown to blackish and without distinct white or pale spots. Side of head mostly yellowish, otherwise side of head about same in color as top of head. Lateral pronotal lobes slightly to moderately darker than pronotal disk. File of holotype with 169 teeth. Other files with 155–204 teeth. Genitalia as in Fig. 256DE. Body length to end of HW 24–27 mm; FW length 15–18 mm; femur III 7.5–8.8 mm; cerci 12–13.3 mm.

Females: Coloration very similar to male. Body length ca. 22 mm; FW length 18 mm; femur III length 8.5 mm; tibia III 7 mm; ovipositor 7.2 mm. Ovipositor as in Fig. 259U.

VARIATION. Files in this species vary as follows: Darwin (175 teeth); near Mt. Sandford (195); near Inverway HS (155); near Broome (196); Prince Regent River (204); Warburton Ra. (174).

HOLOTYPE. ♂, Tindal, 8 miles ESE of Katherine, NT, 6 xii 1967 (W. J. M. Vestjens) ANC.

SONG. Not known.

HABITAT. Probably eucalyptus tangles and bark.

SPECIMENS. Holotype ♂ ANC. NORTHERN TERRITORY: Tindal, 6 xii 1967, 1♂ UM. Darwin, 3 xii 1963 (Sedlacek) 1♂ BISH. 17.7 km SSW Mt. Sandford, 31 vii 1973 (Kelsey) 1♂ ANC. 18 km E Inverway HS, 1 viii 1973 (Kelsey) 1♂ ANC. WESTERN AUSTRALIA: 5 km E of Broome, 24 viii 1976 (Common) 1♂ ANC. Prince Regent River Reserve, 15.34S 125.25E, 20–25 viii 1974 (Bailey, Richards) 2♂ ANC. Kimberley Research Station, via Wyndham, 22 viii 1955 (Langfield) 1♂ ANC. Warburton Ranges, 18 xi 1962 (de Graaf) 1♂ WAM.

Riatina mundiwindi n. sp., Figs. 256F, 257I, 258RST, 259ER

RANGE. Hamersley region of northwestern WA.

RECOGNITION. Males: Most similar to *R. padiminka* but face without small tubercle beneath each eye (Fig. 259E). Face marked as in Fig. 257I. Body color pale, face reddish-brown. Dorsum of head reddish, especially from adjacent to eyes to front of head. Frons truncated. Clypeus and labrum pale, much lighter than frons. Side of head sometimes with thin pale line running along lower front margin of each eye. Sides of head and pronotum same color as dorsum. FW venation as in Fig. 258RST. File with 128, 146, 158, 159, and 181 (holotype) teeth. Legs reddish. Genitalia as in Fig. 256F. Body length ca. 23 mm; FW length ca. 18 mm; femur III ca. 9.5 mm.

Females: Body length to end of HW 27, 28 mm; FW length ca. 19 mm; femur III length ca. 10 mm; ovipositor length ca. 10 mm.

VARIATION. A male from Narra Namba has 128 teeth; three males from A-895 have 146, 158, and 159 teeth, while holotype has 181 teeth. This range of variation is considerable and raises doubts in our mind about placing all of these specimens in the same species. On other morphological grounds they do appear to be conspecific.

HOLOTYPE. ♂, A-704, Gascoyne River, at Route 1, WA, 10 v 1969, ANC.

SONG. Not known.

HABITAT. Found and heard in tangle of dry eucalyptus leaves.

SPECIMENS. Holotype ♂ ANC. A-704 1♂ ANC. A-895 3♂ 2♀ ANC. Narra Namba, Hamersley Range, WA, 7 vii 1966 (Blockley) WAM.

VILLOSICEPS GROUP

The two species in this group have similar genitalia, quite distinct from that of other groups. The

face lacks tubercles but possesses distinct pale markings (Fig. 257E). The mirror is quite well-developed (Fig. 258CD).

vilosiceps

1. Facial markings more as in Fig. 257E.
2. File with 196–205 teeth.

brevicauda

1. Facial markings more as in Fig. 257F.
2. File with 151–168 teeth.

Riatina villosiceps (Chopard), Figs. 256G, 257E, 258CD, 259DP

Hemiphonus villosiceps Chopard 1951: 501. Holotype ♂, Groote Eylandt, NT, SAM. Type examined.

RANGE. Extreme northern NT.

RECOGNITION. Males: Most similar to *R. brevicauda*. Both species lack tubercles on their faces but possess at least 6 yellowish spots. *R. villosiceps* usually lacks the long pale stripe beneath eye possessed by *R. brevicauda*. In *R. villosiceps* face sometimes quite dark, even dark brown, and file possesses 196–205 teeth (n=4). Genitalia in these two species quite similar to one another but quite different from any other species (Fig. 256G). Side of head and pronotum distinctly darker than dorsum, but never black. Body length to end of HW 22.0–25.0 mm; FW length 14.5–15.5 mm; femur III length 8–9 mm; cercal length ca. 13 mm.

Females: Similar to male in color and facial pattern. Body length to end of HW 29 mm; FW length 18 mm; femur III length 10.3 mm; ovipositor length 7.0 mm.

SONG. Not known.

HABITAT. Probably living under bark in trees. Most individuals evidently collected at lights.

SPECIMENS. Holotype ♂ SAM. NORTHERN TERRITORY: 12.51S 132.47E, 10 km E by N of Mt. Cahill, 22 v 1973 (Key) 2♂ ANC. 18 km E by N of Oenpelli, 1 vi 1973 (Key) 1♂ ANC. Darwin, 3–9 xii 1963 (Sedlacek) 3♂ BISH. 11.07S 132.08E, Smith Point, Cobourg Peninsula, 31 i 1977 (Bakker) 2♂ ANC. Same place, 17 ii 1977 (Weir) 3♂ ANC. Same place, 8 ii 1977 (Lewis) 2♂ 1♀ ANC. 11.09S 132.09E, Black Point, Cobourg Pen, 8 ii 1977 (Lewis, Barrett) 1♂ ANC.

Riatina brevicauda (Chopard), Figs. 256H, 257F, 258EF

Podoscirtus brevicauda Chopard 1925: 52. Holotype ♀, Kimberley district, NW Australia (Mjöberg) SM. Transferred to *Mundeicus* by Chopard 1951. Type examined.

Hemiphonus gracilis Chopard 1951: 500. Holotype ♂, Darwin NT (G. F. Hill) SAM. Type examined. NEW SYNONYM.

RANGE. Northern QLD, NT, WA.

RECOGNITION. Males: Body straw-colored. Most similar to *R. villosiceps* but facial marking somewhat different (Fig. 257F). Like *R. villosiceps*, has at least 6 pale facial markings and lacks facial tubercles. Face light brown to medium brown, never blackish. Most distinctive mark is long pale streak which runs beneath and behind eye (Fig. 257F). File with 151–168 teeth (n=5). Male genitalia as in Fig. 256H. Body length to end of HW 19–23 mm; FW length 12–15 mm; femur III length 6.7–8.0 mm; cercal length ca. 11 mm.

Females: Similar to males. Body length to end of HW 22–26 mm; FW length 15–17.5 mm; femur III length 7.7–9.0 mm; ovipositor length 6–7 mm.

SONG. Not known.

HABITAT. Not known. Probably eucalyptus trees.

SPECIMENS. Holotype ♂ SAM. QUEENSLAND: Thornton River, 60 mi NE Camooweal, 18 v 1972 (Monteith) 1♂ uqc. Cloncurry, 22 iv 1962 (Key) 1♂ ANC. 107 mi SSW Normanton, 14 x 1965 (Mesa, Sandulski) 1♀ ANC. NORTHERN TERRITORY: 6.4 km SSW Victoria River Downs, along Wickham River, 18 vi 1973 (Kelsey) 4♂ ANC. 12.8 km ENE Victoria River Downs, 8 vi 1973 (Kelsey) 1♂ ANC. 17.7 km SSW MT Sandford, 30 vi 1973 (Kelsey) 1♀ ANC. Cattle Creek, 54 km S by W Borroloola, 27 x 1975 (Upton) 1♀ ANC. Bukalara Range, 47 km SSW Borroloola, 16 iv 1976 (Key et al.) 1♂ ANC. 22 km WSW Borroloola, 16 iv 1976 (Key et al.) 1♂ ANC. Bing Bong HS, N of Borroloola, 20 iv 1976 (Key et al.) 1♂ ANC. Mataranka, 1 iii 1967 (Upton) 1♂ ANC. 4 mi W by S Coolibah HS, 15.34S 130.54E, 24 vi 1968 (Mendum) 1♀ ANC. WESTERN AUSTRALIA: 8 mi S Lansdowne HS, 3 ix 1964 (Plumb) 1♂ ANC. Kimberley dist, vi-vii 1964 (Plumb) 1♀ ANC. 18.53S 123.43E, 186 km SE by E Broome, 11 viii 1976 (Common) 1♂ 1♀ ANC. Myrooda Crossing Fitzroy River, 28 v to 6 vi 1951 (Guppy) 1♂ 1♀ ANC. Prince Regent River Reserve, 15.24S 125.25E, 20 viii 1974 (Bailey, Richards) 1♂ ANC.

PULKARA GROUP

The two species of this group have large, once-divided mirrors (Fig. 258AB). The genitalia have a slender dorsal point and rather broad lateral processes. The face lacks tubercles. File with fewer than 100 teeth.

pulkara

1. Mirror exceptionally large (Fig. 258A).
2. Dorsum of rostrum blackish.
3. Face, side of head, and lateral lobes blackish.

karralla

1. Mirror smaller (Fig. 258B).

2. Dorsum of rostrum not black.

3. Head and pronotum entirely pale brown or straw-colored.

Riatina pulkara n. sp., Figs. 256J, 257J, 258A, 259FL

RANGE. Southcentral WA.

RECOGNITION. Males: Face dark, without tubercles, and without pale spots above clypeus. Maxillary palpi entirely pale. Side of head dark brown to black. Dorsum of head dark brown anterior of a line connecting the back of the eyes. Frons somewhat rounded in front, not pointed. Scape brown. Lateral pronotal lobes dark brown or black, dorsum light brown. Legs slightly reddish. FW's with large mirror (Fig. 258A) divided by one vein. File with 88, 93 teeth (n=2). Genitalia as in Fig. 256J. Body length to end of HW 25–28 mm; FW length 17.0–18.5 mm; femur III length ca. 9 mm. Holotype measurements: Body length 19.5 mm; FW length 18.5 mm; femur III 9 mm; tibia III 9 mm; cerci broken. File with 88 teeth.

Females: Coloration similar to males. Body length to end of HW 28, 32 mm; FW length 19, 21 mm; femur III length ca. 9.5 mm; ovipositor length 8.3–8.7 mm.

HOLOTYPE. ♂, 34 miles east of Cosmo Newberry Mission, WA, 14 x 1960 (Chinnick, McCabe, Corby) ANC.

SONG. Not known.

HABITAT. Probably eucalyptus trees.

SPECIMENS. Holotype ♂ ANC. ♀, same data as holotype, ANC. Lake Violet Station, WA, 27 ix 1927 (Hopegood) 1♂ WAM. 12 mi N Norseman, WA, 25 xi 1958 (Riek) 1♂ ANC. 2 km S of Lake Miranda, SSW of Wiluna, WA, 12 i 1972 (White) 1♀ ANC.

Riatina karralla n. sp., Figs. 256L, 257K, 258B, 259S

RANGE. Extreme northern WA and northwestern NT.

RECOGNITION. Males: Probably most closely related to *R. pulkara* on the basis of genitalia and wing venation. Face very pale, without yellow or white spots and without tubercles or undulating surface. Face relatively high compared to other species. Front of rostrum truncated. Side of head and pronotum about same color as dorsum. Occiput with longitudinal pale stripes. FW with well-developed, once divided mirror. File with 71–85 teeth (n=6) (holotype with 84 teeth). Genitalia most sim-

ilar to *R. pulkara* (Fig. 256L). Body length to end of HW 23–26 mm; FW length 16–17 mm; femur III length 9–10 mm; cercal length 13–15 mm.

Females: Similar to males in color and facial characteristics. Body length to end of HW 27–32 mm; FW length 17–20 mm; femur III length 9.5–11 mm; ovipositor length 7–8.5 mm; cercal length 15–17 mm.

HOLOTYPE. ♂, Carson Escarpment, Kimberley district, 14.49S 126.49E, WA, 9–15 viii 1975 (Common, Upton) ANC.

SONG. Not known.

HABITAT. Specimens were evidently all collected at lights, therefore their precise habitats remain unknown, but they probably live under bark in eucalyptus trees.

SPECIMENS. Holotype ♂ ANC. WESTERN AUSTRALIA: Same data as holotype, 1♀ ANC. 15.02S 126.55E, Drysdale R, Kimberley dist, 8 viii 1975 (Common, Upton) 4♂ 3♀ ANC. 14.39S 126.57E, Drysdale R, 18–21 viii 1975 (Common, Upton) 2♂ 1♀ ANC. Prince Regent River Reserve, 15.34S 125.25E, 17–28 viii 1974 (Bailey, Richards) 3♂ 2j ANC. NORTHERN TERRITORY: 4 mi W by S of Coolibah HS, 15.34S 130.54E, 1 vii 1968 (Mendum) 1♂ 1♀ ANC. 47 mi SW by W Daly River Mission, 14.11S 130.08E, 28 viii 1968 (Mendum) 1♂ ANC.

Genus HEMIPHONUS Saussure

Hemiphonus Saussure 1878: 760. Type species: *Hemiphonus vittatus* Saussure (Queensland), by monotypy. NEW SYNONYM of *Hemiphonus continuus* (Walker) 1869: 67.

Chopard (1968) included seven species in the genus, all from Australia. He lists *H. vittatus* (now *H. continuus*) from Australia and Fiji, and a female specimen in the Geneva Museum from Fiji did look somewhat like *H. continuus*. However the male is needed to identify the Fijian species with certainty. Five of the species placed under *Hemiphonus* by Chopard (*frontalis*, *callosifrons*, *tuberculifrons*, *gracilis*, and *vilosiceps*) are moved to a new genus *Riatina*. Another species (*H. vicinus*) becomes a junior synonym of *H. continuus*.

As presently understood the genus includes three species, *H. continuus* (Walker) and two new species, *H. wilparina* and *H. yinbilliko*.

RECOGNITION. The genus possesses the following combination of characteristics which distinguish it from other Australian Podoscirtini: M and R veins

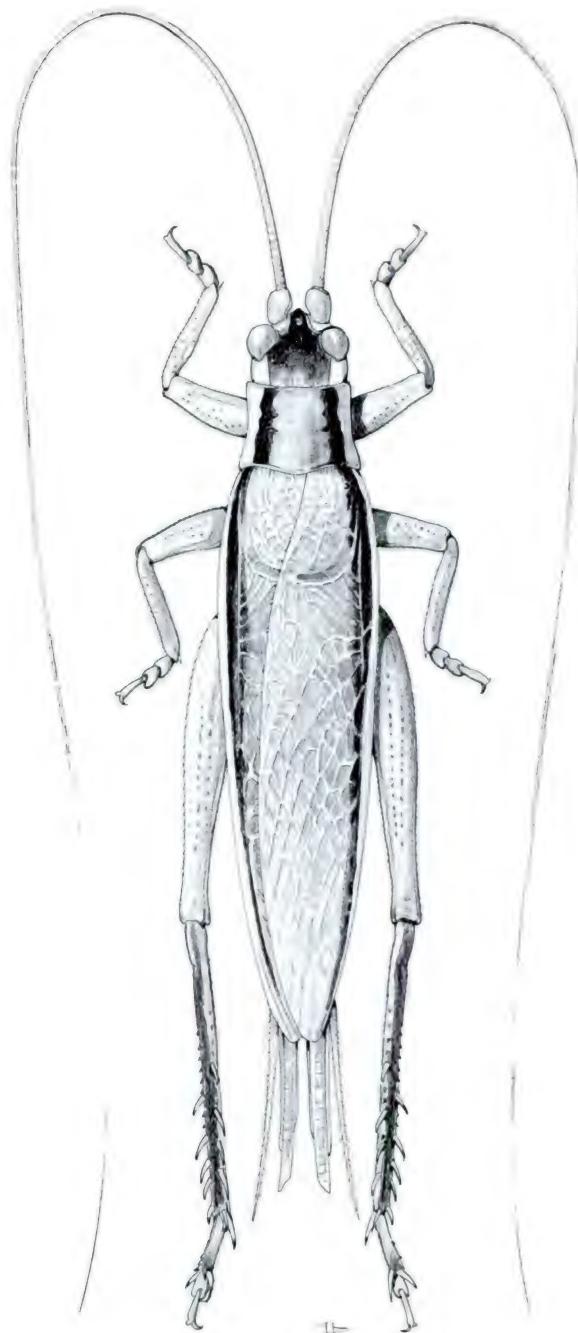


FIG. 260. *Hemiphonus continuus*.

on FW fused briefly in first third of wing (Fig. 266) (shared with *Mundeicus*). Male genitalia strongly asymmetrical (Fig. 265). Tibia I with large inner and outer tympana. FW's extending beyond end of abdomen. Males with stridulatory file. Body not flat-

tened; head not much wider than high. Mirror always absent in male. Head narrower than widest part of pronotum. Pronotum narrower in front than back and wider than long. Disk of pronotum with a depression almost in center. The two most similar genera are *Mundeicus*, in which males lack stridulum, and *Riatina* in which head is relatively flattened, pronotum does not narrow anteriorly (cf. Fig. 254), and R and M veins are not fused. Females of *Mundeicus* and *Hemiphonus* especially difficult to separate when not associated with males; however, *Hemiphonus* females usually 30 mm or more in length (to end of ovipositor) and *Mundeicus* females less than 30 mm.

yinbilliko

1. FW with dark dashed line along the Cu₁ vein.
2. Femur III very hairy and narrow; length more than 5.5 times width.
3. Males not known; female FW venation as in Fig. 266N.

continuus

1. FW with more or less continuous dark streak along the Cu₁ vein.
2. Femur III not especially hairy and less narrow; length less than 4.5 times width.
3. Male FW with 5–35 teeth; venation more like Fig. 266O.

wilparina

1. FW with more or less continuous dark streak along the Cu₁ vein.
2. Femur III as in *continuus*.
3. Male FW with 50–70 teeth, venation more like Fig. 266Q.

***Hemiphonus continuus* (Walker), Figs. 260, 265K, 266OP**

Platydactylus continuus Walker 1869: 67. Holotype ♀, North Australia, HEC. *Madasumma continua*, Chopard 1951: 497. Type examined.

Hemiphonus vittatus Saussure 1878: 760. Type ♀, Rockhampton, QLD, GM. Type examined. NEW SYNONYM.

Hemiphonus vicinus Chopard 1951: 500. Holotype ♂, Brisbane QLD, 2 iv 1918 (H. Hacker) SAM. Type examined. NEW SYNONYM.

RANGE. Southeastern QLD.

RECOGNITION. Males: Very similar to *H. wilparina* but differing in number of file teeth and FW venation (Fig. 266O). Body color pale grey-brown with prominent black stripes running along dorso-lateral margins of body, from pronotum to ends of FW's (Fig. 260). Dorsum of head sometimes blackish, especially on rostrum. Face pale. Auditory tympana large on both surfaces, inner openings considerably longer than outer. FW venation as in Fig. 266OP. File with 7, 13, 34 teeth (n=3). Femur

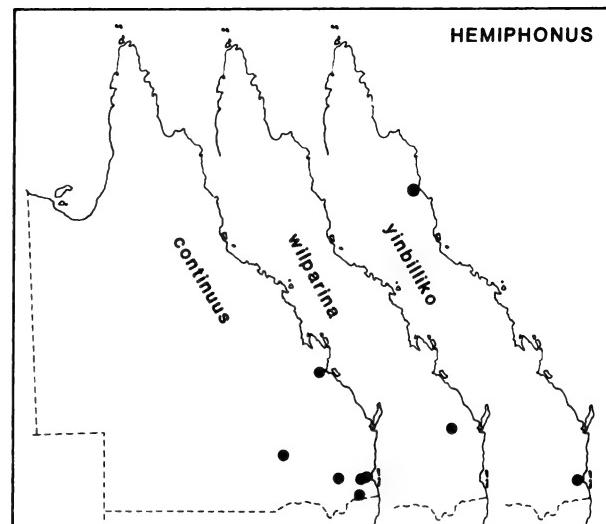


FIG. 261. *Hemiphonus* distributions.

III with numerous small speckles, usually arranged in longitudinal rows. Tibia III dark brown between the two rows of spines and spurs, and with 4 inner and 4 outer subapical spurs. Genitalia as in Fig. 265K. Body length ca. 22 mm, with wings ca. 31 mm; femur III ca. 12 mm; tibia III ca. 10.5 mm.

Females: Similar to males in color, but dark bands at side of body not extending to ends of FW's; instead band becomes intermittent about halfway along FW and stops in last quarter. Legs colored and armed as in male. Ovipositor ca. 12 mm; body length ca. 25 mm; with wings ca. 37 mm; femur III ca. 14 mm; tibia III ca. 12 mm.

SONG. Not known. Number of file teeth in this species varies tremendously—in Brisbane area from 7 to 34 teeth—leading us to believe that males no longer stridulate. Teeth present are also irregularly spaced and difficult to locate on stridulatory vein.

HABITAT. Probably arboreal. The related species *H. wilparina* has been collected from under bark and it seems likely that this species lives in similar places.

SPECIMENS. Holotype ♀ HEC. QUEENSLAND: Rockhampton, 1♀ GM. Brisbane 1♂ SAM. Brisbane, xii 1965 (Burgess) 3♂ 1♀ UQC. Darlington, 21 ii 1957 1♂ 1♀ UQC. Spring Bluff, v 1960 (Bryan) 1♀ UQC. Cairns (Dodd) 1♀ SAM. Cedar Creek, 13 iii 1955 (Downes) 1♀ UQC. Kenmore, 9 iii 1965 (Silcock) 1♀ UQC. Lamington National Park, 17–21 v 1965 (Curtis) 1♀ UQC; 28 v 1959 (Perkins) 1♀ UQC.

Hemiphonus wilparina n. sp., Figs. 265L, 266QR

RANGE. Type locality in Bluff Range near Biggenden, QLD.

RECOGNITION. Males: Pale brown with strong black stripes along lateral edges of dorsum. Very similar to *H. continuus* but differing in number of file teeth and FW venation (Fig. 266QR). Face entirely pale. Dorsum of head without black pigmentation. Pronotal disk with narrow black band along shoulder and pale streak outside this. Holotype with 65 teeth, a paratype has 70 teeth. Male genitalia as in Fig. 265L. Body length to end of HW 26–28.5 mm; FW length 16–19 mm; femur III length 9–10.2 mm; cercal length 12–14 mm.

Females: Similar to males in color but dark streaks at margins of dorsum not distinct or absent beyond midpoint of FW, sometimes forming a series of dark spots inside the angles formed by Cu₁ vein and its branches. Body length to end of ovipositor 30–33 mm; FW length 19–20 mm; femur III length 11–12 mm; ovipositor length 10.5–11.5 mm; cercal length ca. 19 mm.

HOLOTYPE. ♂, Bluff Range, near Biggenden, QLD, 1–7 i 1972 (H. Frauca) ANC.

SONG. Not known. This species, unlike *H. continuus*, possesses a well-developed file and we surmise that it is still used in stridulation, perhaps mainly for close range communication. The species probably does not have a long distance calling song.

HABITAT. Probably resides under bark of eucalyptus trees.

SPECIMENS. Holotype ♂ ANC. Same data 6♂ 10♀ ANC.

Hemiphonus yinbilliko n. sp., Figs. 266N, 267HJ

RANGE. Eastern coastal QLD.

RECOGNITION. Females: Lateral dark streak on FW's is a broken line—series of longer dark streaks 1.5–2.0 mm in length interrupted by pale sections about one-third as long. Body exceptionally hairy, especially hind tibiae where hairs are longer than tibia is thick. Hind femora much thinner than in previous two species—length of femur 5.83 times its greatest width. (In *H. continuus* and *H. wilparina* L/W = 4.1–4.4.) Venter of antennal scape marked as in Fig. 267H. Tibiae III with series of dark spots along ridges on which spines and spurs are situated. Body length to end of ovipositor 32–34 mm; FW length ca. 23 mm; femur III length ca.

13 mm; ovipositor length 13–13.5 mm; cercal length ca. 17 mm.

HOLOTYPE. ♀, Brisbane QLD, 15 iv 1961 (H. McDougal) UQC.

SONG. Not known.

HABITAT. Not known, probably living in tree foliage.

SPECIMENS. Holotype ♀ UQC. Brisbane, QLD, vi 1952 (Dye) 1♀, UQC. Station Creek, 8 mi NW by N Mount Molloy, nr. Mossman, QLD, 2 ii 1970 (Brooks) 1♀ ANC.

Genus MUNDEICUS Chopard

Mundeicus Chopard 1951: 504. Type species: *Podoscirtus longifemur* Chopard, by original designation.

Chopard (1968: 398) includes five species in the genus, three from Australia, one from Burma and one from Selangor, Malaysia. One of the Australian species (*brevicauda*) belongs to the new genus *Riatina*. In this work we add to the genus four new species and one of Chopard's species, *M. brunneovariegatus*, which was formerly under *Dolichogryllus*, an African genus with stridula.

RECOGNITION. Figs. 262, 264. In general aspect this genus shows much variation—from pale smooth insects to dark roughly sculptured species. Males lack a stridulum and have the FW venation similar to females (unlike *Riatina* and *Hemiphonus*). In both sexes M and R veins briefly fused in anterior third of FW's (like *Hemiphonus*, but unlike *Riatina* and *Aphonoides*). Epiphallus strongly asymmetrical with only a median lobe (like *Hemiphonus*, but unlike *Riatina* which is only slightly asymmetrical and *Aphonoides* which is symmetrical and bilobed). Pronotal disk usually has central depression and varies between species from being flat to being highly undulating; disk usually blackish along margins, usually with a narrow whitish or yellow line running along shoulder. FW's always extend beyond end of abdomen and HW's always extend beyond FW's. Tibiae usually hairy. Both inner and outer auditory tympana well-developed.

Longifemur Group

1. Cu₁ vein on FW entirely pale or alternately pale and dark.
2. Major longitudinal veins of FW dorsum more evenly spaced (Fig. 266A–E) except *panimilli* (Fig. 266KLM).
3. Body color pale brown or streaked grey.

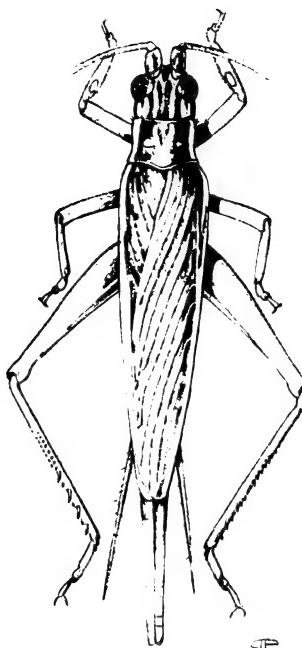


FIG. 262. *Mundeicus longifemur*.

Warringus Group

1. Cu₁ vein not pale or alternatingly pale and dark.
2. Major longitudinal veins usually irregular, not parallel (Fig. 266FGJ).
3. Body color variegated, often bark-colored, dark grey to reddish.

KEY TO *MUNDEICUS* SPECIES

1. Body color strongly speckled with grey or brown and black (having the appearance of bark) (e.g. Fig. 264) ... 2
Body color unicolorous brown or more evenly marked; not bark-colored (e.g. Fig. 262) 3
2. Face with broad black band running across lower half of frons and onto cheeks. Vertex of head with two tubercles. Disk of pronotum strongly concave (Figs. 264, 267E) *brunneovariegatus*
Face without broad transverse black band. Vertex of head without two tubercles. Disk of pronotum slightly concave (Fig. 267O) *quinnia*
3. FW's nearly uniformly brown or reddish-brown in color (but first third of R vein sometimes yellow) and without pale veins along entire FW angle. Pronotal disk with definite transverse step dividing middle-third from posterior third of disk; profile more like Fig. 267RS. Eyes banded as in Fig. 267F *warringus*
FW's with pale veins or alternately pale and dark along

- FW angle. Pronotal disk without distinct transverse step; pronotal profile more like Fig. 267TU. Eyes unbanded or not banded as in Fig. 267F 4
4. Sc vein with 9–11 visible branching points. Cu₁ vein uniformly pale in last two-thirds of FW. Dorsum of FW with at least 10 major longitudinal veins (excluding Cu₁) 5
 - Sc vein with 4–6 visible branching points. Cu₁ vein alternatingly pale and darker, and small angles between Cu₁ and its branches darkly pigmented. Dorsum of FW with fewer than 10 major longitudinal veins in males (excluding Cu₁) 6
 5. Dorsum of femur III with two brown spots, one near center and one at three-quarter point. Genitalia as in Fig. 265D. Dorsum of FW with 10 longitudinal veins (exclusive of Cu₁). Cells on dorsum of FW often irregular (Fig. 266B) *nillanilla*
Dorsum of femur III unspotted (Fig. 262). Genitalia as in Fig. 265A. Dorsum of FW usually with more than 10 longitudinal veins (excl. Cu₁). Cells on dorsum of FW more rectangular (Fig. 266A) *longifemur*
 6. Face with dark pigmentation below eye sockets (Fig. 267AB). FW venation more like Fig. 266KLM. Genitalia as in Fig. 265E *panimilli*
Face without dark pigmentation below eye sockets. FW venation more like Fig. 266DE. Genitalia as in Fig. 265BC *tindalei*

LONGIFEMUR GROUP

This group of four species has the Cu₁ vein of the FW entirely pale or alternatingly pale and dark. Major longitudinal veins of FW dorsum usually more evenly spaced than in the next group. Body color varies from pale, uniform light browns to streaked grey. Pronotal disk does not have a distinct step between posterior third and front two-thirds (Fig. 267Q TU). Male body length to end of HW 18–24 mm; female body length to end of ovipositor 29–32 mm.

Subgroup A (*longifemur*, *nillanilla*)

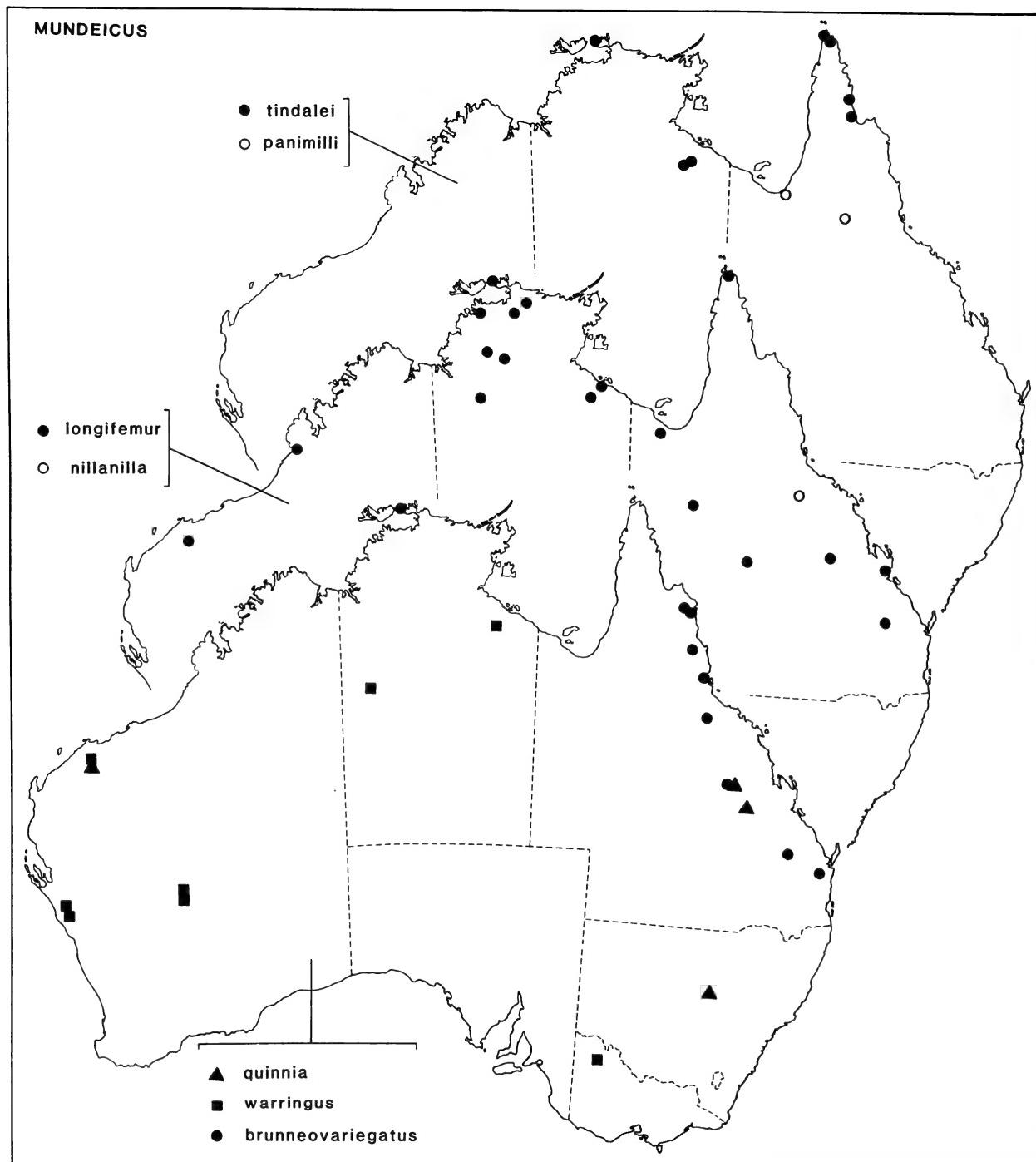
1. Sc vein with 9–11 visible branching points.
2. Cu₁ vein uniformly pale in last two-thirds of FW.
3. Dorsum of FW with at least 10 major longitudinal veins.
4. Dorsum of FW streaked.

Subgroup B (*tindalei*, *panimilli*)

1. Sc vein with 4–6 visible branching points.
2. Cu₁ vein alternating pale and dark.
3. Dorsum of FW with fewer than 10 longitudinal veins.
4. Dorsum of FW usually streaked.

***Mundeicus longifemur* (Chopard), Figs. 262, 265A, 266A, 267QTV**

Podoscirtus longifemur Chopard 1925: 51. Holotype ♂, Broome, WA (Mjöberg) SM. Transferred to *Mundeicus* by Chopard 1951. Type examined.

FIG. 263. *Mundeicus* distributions.

RANGE. Northern Australia, from QLD to WA.

RECOGNITION. Males: Face and side of body very pale. Dorsum of body uniformly light brown but darker toward lateral margins. Shoulder of pronot-

tum with narrow yellow line—this continues along FW angle where R, M, and Cu₁ veins are yellow. Cu₁ vein uniformly yellow in distal two-thirds of FW. Sometimes there is a black streak along inner

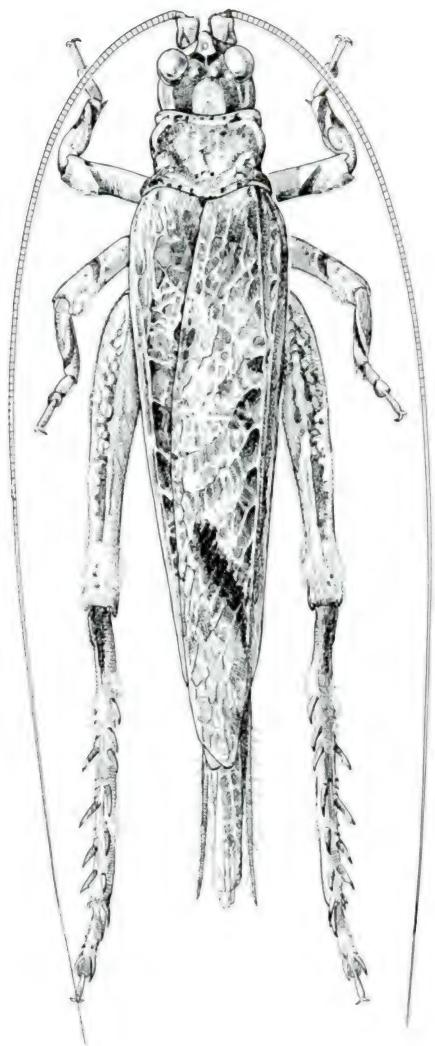


FIG. 264. *Mundeicus brunneovariegatus*.

side of yellow streak. Dorsal field of FW with 10–13 very evenly parallel major veins. Most cells between major veins rectangular. Sc vein with 9–11 visible branches. Legs all very pale. Male genitalia as in Fig. 265A. Body length to end of HW 20–24 mm; FW length 12–16.5 mm; femur III length 7.5–10.0 mm; cercal length ca. 9 mm.

Females: Identical to males but larger. Body length to end of ovipositor 29–32 mm; FW length 17.5–20 mm; femur III length 10–11.5 mm; ovipositor length 13–15 mm; cercal length 14–17 mm.

HABITAT. Usually collected at lights set up in savanna woodlands. Probably lives high in trees.

SPECIMENS. Holotype ♂ SM. QUEENSLAND: Yeppoon, 23 xii 1964 (Common) 2 ♂ ANC. Beames Brook, 15 mi SW Burketown, 20 v 1972 (Monteith) 1 ♂ UQC. Clermont, 15 ii 1975 (Farrow) 2 ♂ ANC. Burnett R. crossing, 10 mi N by E Eidsvold, 9 i 1970 (Britton et al.) 4 ♂ ANC. Lockerbie, Cape York, 15 vi 1969 (Monteith) 1 ♂ UQC. 23.13S 144.04E, Darr R, 31 km NW by N Longreach, 10 v 1973 (Upton) 1 ♂ ANC. Arcadia Valley, 2 iv 1977 (Lewis) 1 ♂ ANC. 1 mi N Oorindi, 3 xi 1969 (White, Marginson) 1 ♂ ANC. NORTHERN TERRITORY: 12.17S 133.20E, Cooper Creek, 11 km S by W Nimbuwah Rock, 1 xi 72 (Britton) 1 ♂ ANC. 11.75S 132.0E, Smith Point, Cobourg Peninsula, 15 i to 31 i 1977, 3 ♂ ANC. Darwin, 9 xii 1963 (Sedlacek) 2 ♂ BISH. Katherine, 18 viii 1973 (Kelsey) 2 ♂ ANC. 6.4 km WSW Victoria River Downs, 13 vi 1973 (Kelsey) 1 ♂ ANC. Victoria River Downs, 11 vi 1973 (Kelsey) 1 ♂ ANC. 12.52S 132.50E, 15 km E Mt. Cahill, 8 iii 1973 (Key) 1 ♀ ANC. 15.54S 136.32E, Batten Point, 30 km NE Borroloola, 18 iv 1976 (Key et al.) 1 ♂ ANC. 16.10S 136.15E, Goose Lagoon, 11 km SW by S Borroloola, 13 x 1975 (Upton) 1 ♂ ANC. 14.19S 132.25E, Katherine Gorge, 24 km NE Katherine, 16 x 1972 (Upton) 1 ♀ ANC. 14.27S 131.14E, 8 mi WNW Dorisvale HS, 21 ix 1968 (Mendum) 1 ♀ ANC. Wauchope, 21 iii 1955 (Key) 1 ♀ ANC. WESTERN AUSTRALIA: 21.35S 117.04E, 0.5 km W Millstream HS, 5 xi 1970 (Upton, Feehan) 1 ♂ ANC. 1 km N Millstream HS, 28 x 1970 (Upton, Feehan) 2 ♂ ANC. 2 km ENE Millstream HS, 21 x 1970 (Upton, Feehan) 8 ♂ ANC. 4 km ESE Millstream HS, 7 xi 1970 (Upton, Feehan) 1 ♂ ANC. 5 km SE Millstream HS, 12 iv 1971 (Upton, Feehan) 1 ♂ ANC. Bev. Springs Station, 11 viii 1974 (Bailey, Richards) 1 ♂ ANC.

Mundeicus nillanilla n. sp., Figs. 265D, 266B

RANGE. Type locality near Charters Towers, QLD.

RECOGNITION. Males: Very similar to *M. longifemur* but genitalia quite distinct (Fig. 265D) and dorsum of FW with 10 major longitudinal veins (usually more than 10 in *M. longifemur*). Sc vein with 9 visible branching points (similar to *M. longifemur*). Dorsal field of FW with black streak along Cu₁ vein. Cells on dorsal field of FW more irregular in shape than in *M. longifemur*. Femur III with two brown spots on upper face, one near middle of femur and one almost halfway between middle and distal end. Body length to end of HW 21 mm; FW length 13.3 mm; femur III length 8.5 mm; cercal length 7.5 mm.

HOLOTYPE. ♂, 27 km E Mirtna HS, south of Charters Towers, QLD, 8 xii 1971 (E. F. Russell) ANC.

HABITAT. Probably living among tree foliage.

SPECIMENS. Holotype ♂ ANC.

Mundeicus tindalei Chopard, Figs. 265BC, 266CDE, 267D

Mundeicus tindalei Chopard 1951: 505. Holotype ♂, Stewart River, QLD, i 1927 (Hale and Tindale) SAM. Type examined.

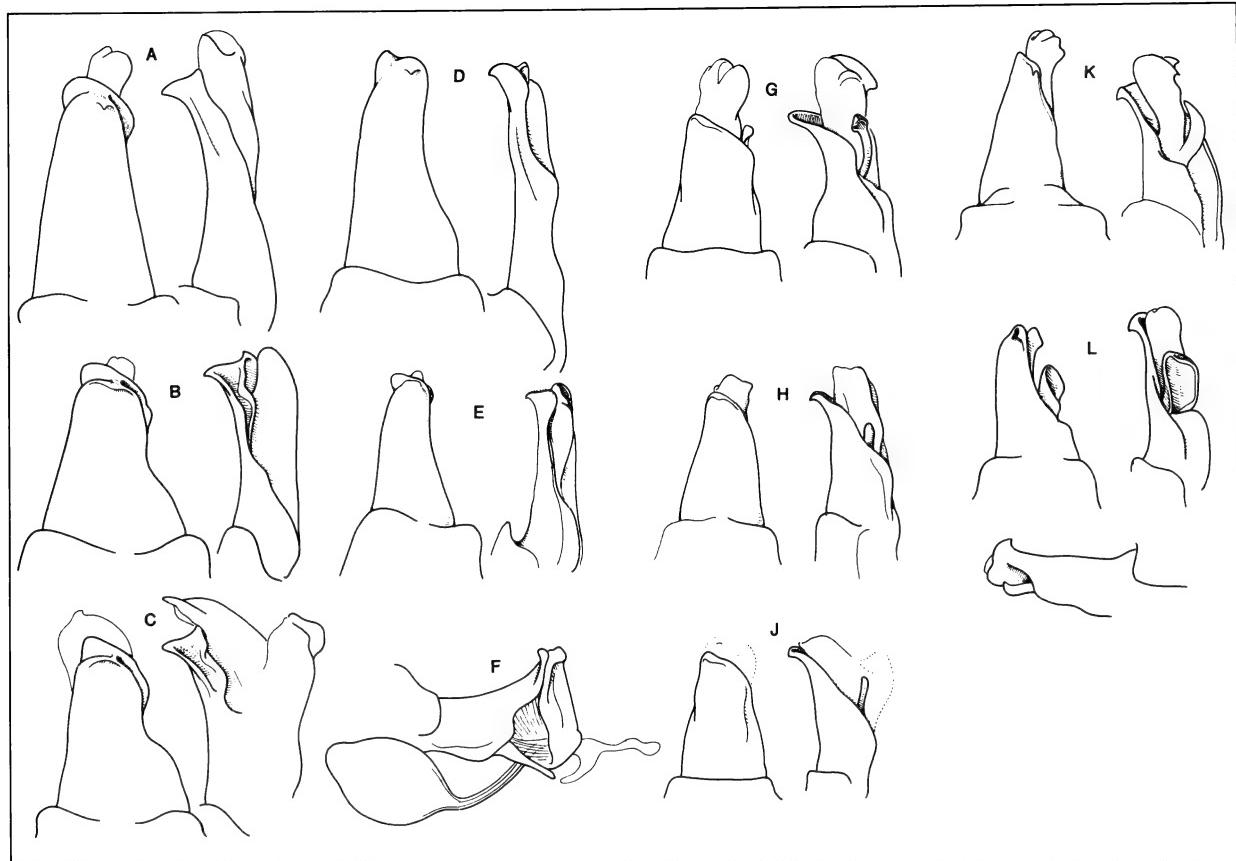


FIG. 265. *Hemiphonus* and *Mundeicus* male genitalia (dorsal and lateral views). A, *M. longifemur* Eidsvold QLD; B, C, *M. tindalei* near Borroloola NT; D, *M. nillanilla* holotype; E, *M. panimilli* holotype; F, *M. warringus* showing everted endophallus with spermatophore; G, *M. brunneovariegatus* Proserpine QLD; H, *M. warringus* Kathleen Valley WA; J, *M. quinnea* Clermont QLD; K, *Hemiphonus continuus* Brisbane QLD; L, *Hemiphonus wilparina* holotype.

RANGE. Northern NT and Cape York Peninsula, QLD.

RECOGNITION. Males: Body color ranging from very pale, straw-colored to light grey. Dorsum of body slightly to distinctly darker than sides, and dorsum of FW's streaked with lighter and darker lines. Cu₁ vein not entirely yellow or pale in distal two-thirds as in *M. longifemur* but alternating whitish and brownish—white areas usually located at Cu₁ branches. In darker individuals smaller angles formed by Cu₁ branches are dark. Dorsum of pronotum and head marked as in Fig. 267D but somewhat less distinct. Face and sides of body very pale. FW venation as in Fig. 266CD. Dorsal field of FW with 10 or fewer major longitudinal veins. Many of the cells are elongated and irregular in shape compared to more rectangular cells in *M. longifemur*. Sc vein

with 4–6 visible branching points. Male genitalia as in Fig. 265BC. Body length to end of FW's 20–21 mm; FW length 12–13 mm; femur III length 8.5–9 mm; cercal length ca. 7 mm.

Females: Similar to male in color. Body length to end of ovipositor 29–32 mm; FW length 18–20 mm; femur III length 10.7–12.7 mm; ovipositor length 12.5–13.5 mm; cercal length ca. 17 mm.

HABITAT. Probably inhabits the foliage of trees.

SPECIMENS. Holotype ♂ SAM. QUEENSLAND: Lankelly Creek, McIlwraith Range, near Coen, Cape York, 28 x 1969 (Cantrell) 1♀ UQC. Prince of Wales Island, Cape York Islands (Kusche) 2♂ BISH. Lockerbie, Cape York, 1 iv 1964 (Common, Upton) 1♀ ANC. NORTHERN TERRITORY: 16.08S 136.06E, 22 km WSW Borroloola, 16 iv 1976 (Key et al.) 1♂ ANC. 36 km SW Borroloola, 4 xi 1964 (Upton) 1♂ ANC. Bukalara Range, 47 km SSW Borroloola, 23 iv 1976 (Key et al.) 1♂ ANC. 16.40S 135.51E, Bessie Spring, 8 km ESE of Cape Crawford, 26 x 1975

(Upton) 3♂ ANC. 11.07S 132.08E, Smith Point, Cobourg Pen, 19 i 1977 (Farrow) 1♀ ANC.

Mundeicus panimilli n. sp., Figs. 265E, 266KLM, 267ABGMU

RANGE. North central QLD.

RECOGNITION. Males: Very similar to *M. tindalei* but face with dark markings below antennal sockets (Fig. 267B), genitalia as in Fig. 265E and FW venation as in Fig. 266KLM. Dorsum of FW with 8 major veins. These bordered in places by dark pigmentation. Sc with 6 visible branching points. Body length to end of HW 18–18.5 mm; FW length ca. 11 mm; femur III length ca. 7 mm; cercal length ca. 6 mm.

Females: Greyish in aspect. FW venation as in Fig. 266LM. Face as in Fig. 267A. Body length to end of ovipositor 29 mm; FW length 18 mm; ovipositor length 12 mm; cercal length 15 mm.

HOLOTYPE. ♂, Walker Creek, 25 miles southeast of Karumba, QLD, 28 v 1972 (Monteith) UQC.

HABITAT. Probably inhabits tree foliage.

SPECIMENS. Holotype ♂ UQC. Same data 1♂ UQC. 7 mi E Forsayth, QLD, 7 iv 1962 (Key, Corby) 1♀ ANC.

WARRINGUS GROUP

This group of three species includes two species (*brunneovariegatus*, *quinnea*) which are bark colored and one (*warringus*) which is almost uniformly brown or reddish-brown. The Cu₁ vein is not pale or alternatingly pale and dark in the last two-thirds (as in the Longifemur Group). Major longitudinal veins are highly irregular and most cells on dorsum elongated. Pronotal disk either strongly concave or with decided transverse step between last third and front two-thirds. Genitalia as in Fig. 265FGH. Male body length to end of HW 22–35 mm; female body length to end of ovipositor 29–41 mm. The three species can be separated as follows:

brunneovariegatus

Face with broad black band (Fig. 267E). Top of head with two prominent bumps on vertex. Pronotal disk strongly concave and sculptured (Fig. 267N).

quinnea

Without above characteristics. Dorsum of FW streaked and spotted with dark brown.

warringus

Dorsum of FW uniform in color, about the same color as sides.

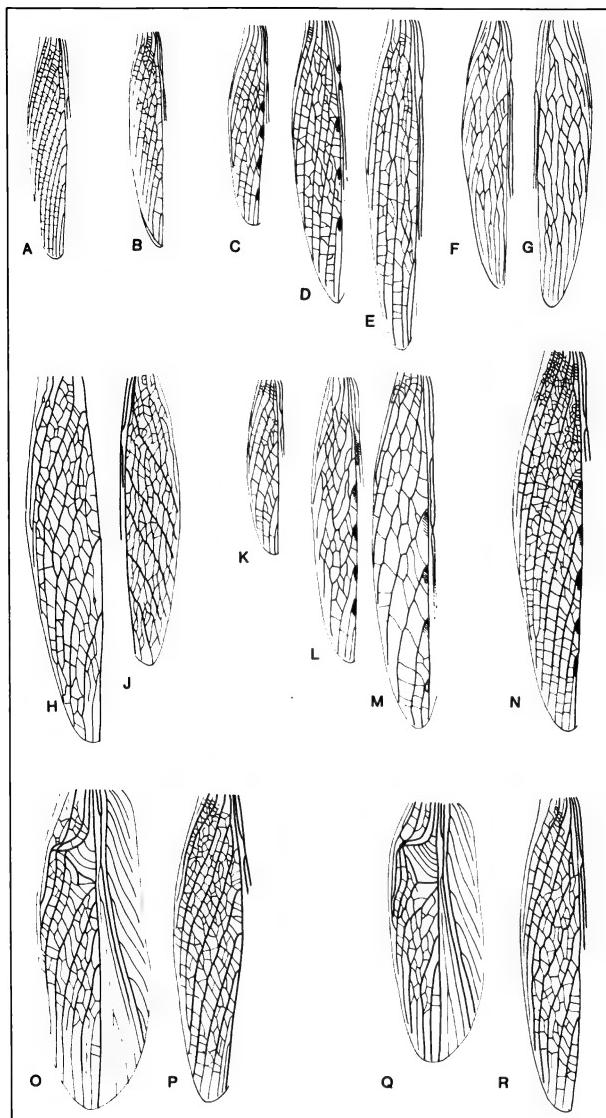


FIG. 266. FW's (all males unless indicated otherwise). A–M, *Mundeicus*. N–R, *Hemiphonus*. A, *longifemur* Goose Lagoon; B, *nillanilla* holotype; C, *tindalei* near Borroloola; D, *tindalei* Lockerbie; E, *tindalei* Lankelly Creek; F, G, *warringus*; H, *quinnia* ♀ Millstream WA; J, *quinnia* ♂ Clermont QLD; K, *panimilli* paratype; L, *panimilli* ♀ Forsyth QLD; M, *panimilli* ♀; N, *Hemiphonus yinbilliko* ♀ near Mt. Molloy; O, *H. continuus* Brisbane; P, *H. continuus* ♀ Lamington Nat. Pk; Q, *H. wilparina* holotype; R, *H. wilparina* ♀ Bluff Range.

***Mundeicus warringus* n. sp., Figs. 265FH, 266FG, 267CFPR**

RANGE. Widespread over interior of Australia from VIC to WA.

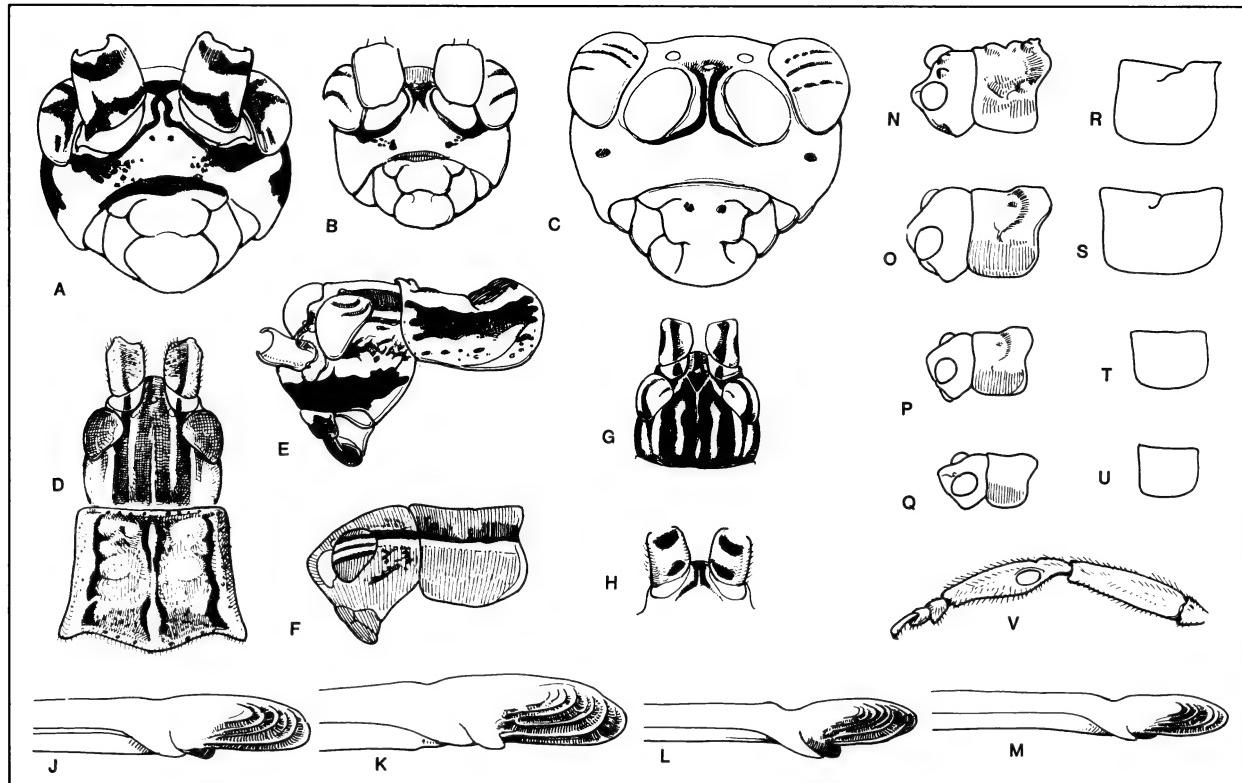


FIG. 267. *Mundeicus*. A, *panimilli* ♀ Forsayth QLD; B, *panimilli* holotype; C, *warringus*; D, *tindalei*; E, *brunneovariegatus*; F, *warringus*; G, *panimilli* ♀ Forsayth QLD; H, *Hemiphonus yinbilliko* dorsum of scapes; J, *Hemiphonus yinbilliko* ovipositor; K, *quinnia* ovipositor Nyangan QLD; M, *panimilli* ovipositor Forsayth QLD; N, *brunneovariegatus*; O, *quinnia*; P, *warringus*; Q, *longifemur*. R-U, lateral lobes: R, *warringus*; S, *warringus*; T, *longifemur*; U, *panimilli*. V, *longifemur* inner leg I.

RECOGNITION. Males: Body color light brown, sometimes with orange cast. Face usually with dark lines bordering antennal sockets. Dorsum of body sometimes slightly darker than sides, sometimes about the same in color. Pronotal disk darker than lateral lobes, usually with dark band along lateral margins. Pronotal shoulder with narrow yellow line (similar to other *Mundeicus*). Pronotal disk with definite transverse step from lower front two-thirds to higher posterior third (Fig. 267P). FW not spotted or streaked, dorsum usually about same color as sides, without yellow veins running along entire FW angle, although R vein usually yellow until it joins with M vein. Dorsal longitudinal veins vary from slightly to highly irregular (Fig. 266FG). Genitalia as in Fig. 265FH. Body length to end of FW's 22–29 mm; FW length 14–20 mm; femur III length 9–11 mm; cercal length 7.5–10 mm.

Females: Similar to males. Body length to end of ovipositor ca. 29 mm; FW length 19 mm; femur III length 10 mm; ovipositor length 11.5 mm; cercal length 12 mm.

VARIATION. In specimens from Victoria step on the pronotal disk not as pronounced as in northern populations, making disk flatter in aspect, and dorsum of FW with flatter appearance as well.

HOLOTYPE. ♂, Cunnamulla (aerodrome), QLD, 21 iii 1972 (Lewis) ANC.

HABITAT. Not known; probably inhabits trees.

SPECIMENS. Holotype ♂ ANC. VICTORIA: Ouyen, 16 iii 1966 (Grant) 1♂ BM. Mallee 1 mi S Ouyen, 16 iii 1966 (Grant) 4♂ BM. NORTHERN TERRITORY: 16.47S 135.45E, McArthur R, 14 km S by W Cape Crawford, 25 x 1975 (Upton) 1♂ ANC. 17.7 km SSW of Mt. Sandford, 30 vi 1973 (Kelsey) 1♂ ANC. 19.08S 130.09E, Wilson Creek, vii–ix 1971 (Hodgson) 1♀ ANC. WESTERN AUSTRALIA: Kathleen Valley, 1963 (Moriarty) 1♂ WAM.

1 km NE Millstream HS, 23 iv 1971 (Key et al.) 7♂ ANC. 15 km E Millstream HS, 20 x 1970 (Upton, Feehan) 1♂ ANC. 2 km S of Lake Miranda, SSW Wiluna, 12 i 1972 (White) 1♂ ANC. 66 mi N Galena, 6 xi 1958 (Greaves) 1♂ ANC. 29 mi N Galena, near Northampton, 22 iv 1968 (Common, Upton) 1♂ ANC.

Mundeicus brunneovariegatus (Chopard), Figs. 264, 265G, 267EN

Dolichogryllus brunneovariegatus Chopard 1951: 497. Holotype ♀, Marree, Australia (L. Reese) SAM. Type examined (see discussion under genus).

RANGE. Eastern QLD and northern NT.

RECOGNITION. Males: Body color a complex mixture of greys and brown and surface of body roughly textured causing the insects to resemble tree bark (Fig. 264). Head with broad black band across face and onto cheeks (Fig. 267E). Vertex of head with two prominent bumps or tubercles between eyes. Dorsum of head sloping steeply from vertex to rostrum. Pronotum highly sculptured, largely concave on disk and with broad ridges and bumps along shoulders. Surface of FW's undulating; veins forming an irregular network. Femora I and II with prominent oblique black band in distal third. Tibiae very hairy. Body length to end of HW 30–35 mm; FW length 19.5–23 mm; femur III length 11–13 mm; cercal length 12.5–14 mm.

Females: Similar to males in color and sculpturing. Body length to end of ovipositor 40, 41 mm; FW length 26, 28 mm; femur III length 14.5, 16 mm; ovipositor length ca. 18 mm; cercal length ca. 20 mm.

HABITAT. Probably lives on and under tree bark. Usually collected at lights. A Britton and Misko label reads: "at light, Eucalyptus—rain forest junction."

SPECIMENS. Holotype ♀ SAM. QUEENSLAND: Cardstone, 7 i 1962 (Carne, Britton) 1♂ ANC. Mareeba, 23 x 1965 (Fitzsimmons) 1♀ ANC. Cooktown, 1♀ ANC. 8 mi NW Proserpine, 11 xii 1968 (Britton, Misko) 2♂ ANC. Brandy Creek, 8 mi NE Proserpine, 11 xii 1968 (Britton, Misko) 1♂ ANC. 10 mi WNW Proserpine, 28 iii 1962 (Chinnick, Corby) 1♂ ANC. 26.00S 153.05E, Camp Milo, Cooloola Nat. Park, 16 x 1978 (Rentz, Balderson) 1♂ ANC. 4 km W by S Cooktown, 21 v 1977 (Common, Edwards) 1♂ ANC. 31 km NW by N Cooktown, 20 v 1977 (Common, Edwards) 1♂ ANC. Keatings Gap, 3 km S by W Cooktown, 16 v 1977 (Common, Edwards) 1♂ ANC. Mount Douglas Station, NW Clermont, 9 xii 1971 (Russell) 1♂ ANC. 2 mi SE Eidsvold, 26 x 1967 (White) 1♂ ANC. Mingela, 21 iv 1955 (Norris, Common) 1♂ ANC. NORTHERN TERRITORY: Smith Point, Cobourg Pen, 15 ii 1977 (Weir) 1♂ ANC.

Mundeicus quinna n. sp., Figs. 265J, 266HJ, 267KO

RANGE. Known from eastern and western Australia.

RECOGNITION. Males: Bark-colored species somewhat similar to *M. brunneovariegatus*. Body color grey (as in holotype) or brown. Head and pronotum not strongly sculptured as in previous species. Face without broad, transverse black band. Eyes strongly banded. Antennae distinctly banded. Disk of pronotum darker than lateral lobes, black along lateral margins, lighter in between. Branches of Cu₁ vein more uniformly spaced. Darkest parts of FW dorsum are in small angles formed by Cu₁ and its branches, and in anterior and posterior angles formed at junction of M and R veins. Lateral surface of FW black or dark brown between Sc and R veins. Genitalia as in Fig. 265J. Body length to end of HW 27, 28 mm; FW length 18 mm; femur III length 10 mm; cercal length ca. 10 mm.

Females: Variable in color—darkest female very dark grey-brown with black markings; lightest, reddish-brown with blackish markings. Dorsum of FW darkest in cells along Cu₁ branches and especially in smaller angles formed with Cu₁ vein. Sides of FW as dark or darker than dorsum.

Body length to end of ovipositor 31–39 mm; FW length 22–24 mm; femur III length 12–13 mm; ovipositor length 13–17 mm (13–14 mm in WA females, 17 mm in NSW female), cercal length ca. 17 mm.

HOLOTYPE. ♂, Clermont, QLD, 15 ii 1975 (R. A. Farrow) ANC.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC. QUEENSLAND: Duck Ponds Station, east of Emerald, 14 ii 1975 (Farrow) 1♂ ANC. NEW SOUTH WALES: Nyngan District, NSW, 1–9 ii 1960 (Woodward) 1♀ uqc. WESTERN AUSTRALIA: 21.35S 117.04E, 1 km NE Millstream HS, WA, 23 iv 1971 (Key, Upton, Mitchell) 4♂ ANC. 15 km E Millstream HS, WA, 20 x 1970 (Upton, Feehan) 1♀ ANC. 0.5 km E Millstream HS, WA, 2 iv 1971 (Upton, Mitchell) 1♀ ANC. Millstream HS, 3 xi 1970 (Upton, Feehan) 1♀ ANC.

Genus APHONOIDES Chopard

Aphonoides Chopard 1940: 203. Type species: *Gryllus (Eneoptera) punctatus* Haan 1842: 232. Designated by Chopard 1968: 399.

The genus includes 17 Australian species, 13 of which are new. The genus is best represented in

northern Australia and especially in Queensland. We collected few individuals of this mute group; most of the specimens we studied were collected by others at lights. Some specimens have been collected on *Melaleuca*, and we believe that the species in this genus may inhabit principally the foliage of trees.

RECOGNITION. Australian members of this genus possess the following combination of distinguishing characteristics: Inner auditory tympanum large and oval, outer tympanum at best indistinct and usually absent; sometimes only a small dimple remains. Males without stridulatory file or mirror. FW's always extending beyond abdomen. HW's always extending beyond FW's. Head narrower than pronotum. Subapical spurs on tibia III begin above middle of tibia. Genitalia bilaterally symmetrical (asymmetrical in *Mundeicus* and *Hemiphonus*). Tibia III with 5–8 inner and 5–7 outer subapical spurs. Apical spur i-1 usually very small (Fig. 277B). Inner and outer subapical spurs usually as in Fig. 277AB. Body length to end of HW 14–20 mm in males; 16–24 mm in females. Ovipositor as in Fig. 276O–Z.

NOMEN DUBIUM

Aphonoides brevis Chopard 1951: 509. The holotype of this species, collected by A. M. Lea in the Cairns District, Queensland, has been lost from the Queensland Museum. Neither the genitalia nor any other characteristic of this species was figured. The allotype examined in the Queensland Museum, was not taken from the same locality as the holotype (from Nanango District, QLD, H. Hacker) and is also not sufficiently distinctive in our opinion to allow recognition of the species to which the name *A. brevis* was applied.

KEY TO APHONOIDES SPECIES

1. Face black or with prominent black bands or other dark markings (Fig. 278) 2
- Face light brown or pale, sometimes with small spots, sometimes with lower half to two-thirds brown but without large contrasting markings 8
2. Face as in Fig. 278A; without broad black band across frons. Cheeks as in Fig. 276N *biangri*
- Face and cheeks not as above 3
3. Face more like Fig. 278C. Side of head as in Fig. 276J
- *karumbae*
- Face and side of head not as above 4
4. Face with some dark areas (Fig. 278B). Genitalia as in Fig. 275J. Median ocellus obsolete *jimjimi*
- Face largely dark. Genitalia not as above 5
5. Back of eyes with two dark horizontal stripes (Fig. 276GH) 6
- Back of eyes not as above 7
6. Face as in Fig. 278D. Side of head as in Fig. 276H.
- Genitalia as in Fig. 275E *agantra*
- Face as in Fig. 278E. Side of head as in Fig. 276G.
- Genitalia as in Fig. 275F *hackeri*
7. Face as in Fig. 278G. Side of head as in Fig. 276L.
- Genitalia as in Fig. 275H *binderi*
- Face as in Fig. 278F. Side of head as in Fig. 276K.
- Genitalia as in Fig. 275G *marika*
8. Body color mottled grey or brown especially on dorsum of FW's. Femora I and II laterally flattened. Legs strongly patterned or banded. Eyes striped. Tibia III usually with 5 inner subapical spurs (see Fig. 5 for method of counting) 9
- Body not mottled, head and pronotum may be different in color from FW's but each body part more or less unicolorous. Femora I and II not laterally flattened. Legs largely of one color, usually yellowish or orange. Tibia III usually with 6 or 7 inner subapical spurs 10
9. Femur III with larger dark markings on outer face (Fig. 277C). Pronotal disk with two dark spots (Fig. 277G).

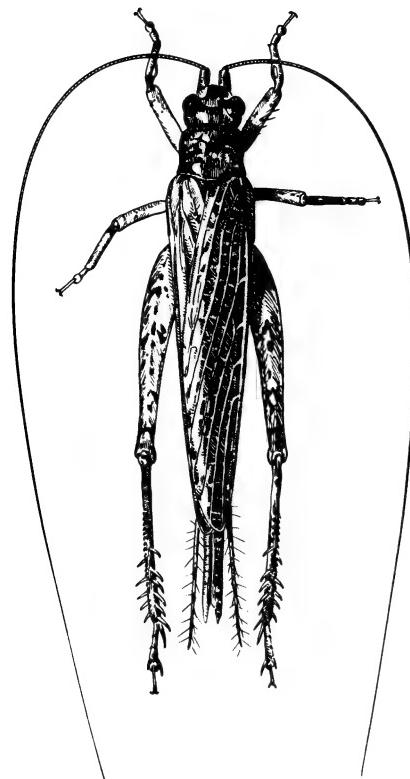
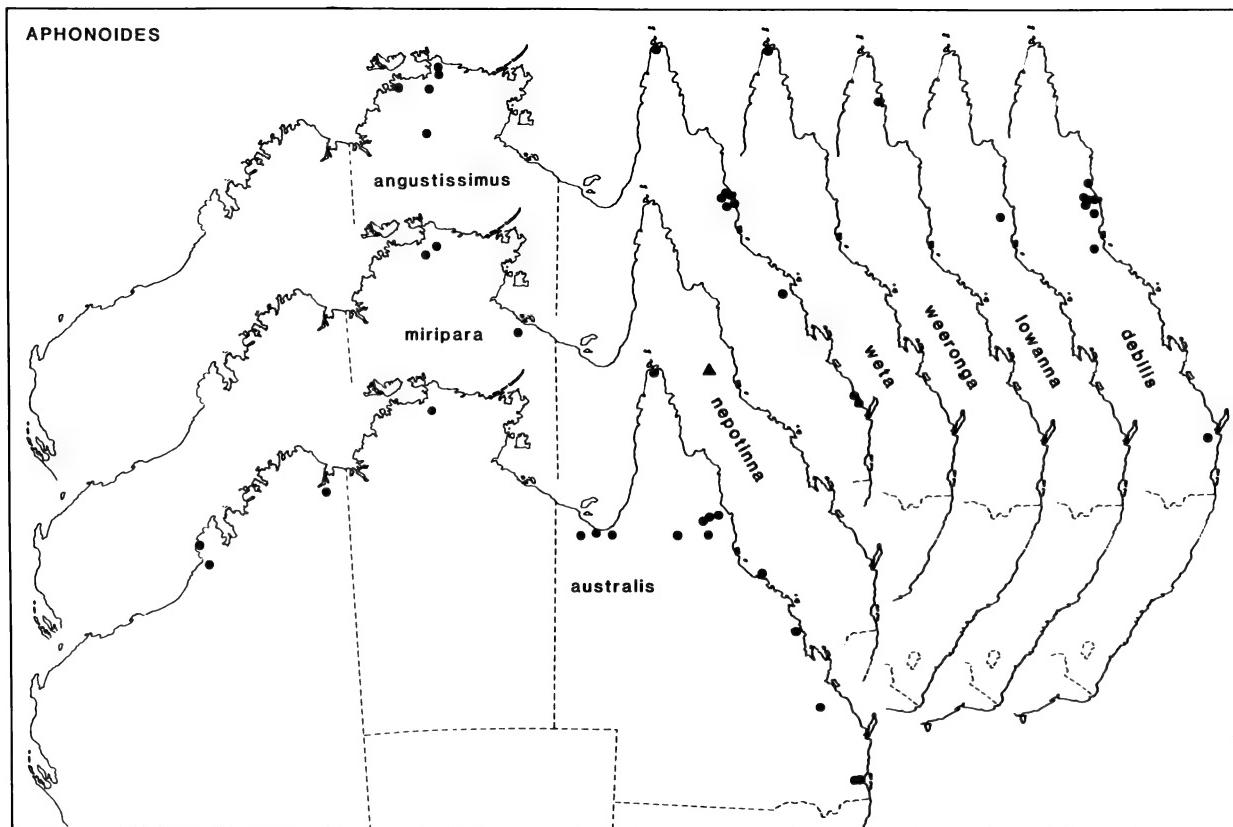


FIG. 268. *Aphonoides debilis*.

FIG. 269. *Aphonoides* distributions.

- Median ocellus scarcely visible or obsolete. Male genitalia as in Fig. 275C *kaikai*
- Femur III somewhat mottled with lighter and darker grey but without larger black spots. Median ocellus small but readily visible. Male genitalia as in Fig. 275D *warratinna*
10. FW's brown and with 4 oblique white spots along lateral margins next to Cu (Lowanna Group) *lowanna*
FW's without prominent white spots along lateral margins 11
11. FW's grey-brown, remainder of body yellow-orange; crossveins somewhat darker than wing membrane. Ocelli as in Fig. 279H *weeronga*
FW's and body not as above; crossveins same color or lighter than membrane. Ocelli not as above 12
12. Body color brownish, especially on FW's. Disk of pronotum usually with two brown spots (Fig. 277F). Ocelli well-developed and with some black pigmentation behind each (Fig. 279E) *debilis*
Body color pale, yellow-orange. Disk of pronotum without brown spots on disk. Ocelli not as above 13
13. Body very slender—greatest length of pronotum equal to or greater than greatest width. Femur III about 6 times as long as wide. Dorsum of head as in Fig. 279D. Genitalia as in Fig. 273E. Tibia III with 6–7 outer subapical spurs (see Fig. 5 for method of counting) *angustissimus*
- Pronotum clearly wider than long. Length of femur III much less than 6 times its greatest width. Dorsum of head not spotted or shaped as in Fig. 279D. Tibia III with 5 outer subapical spurs 14
14. Dorsum of rostrum black (Fig. 279G). All three ocelli large. Genitalia as in Fig. 274D *weta*
Dorsum of rostrum usually yellowish, but sometimes medium to dark brown (Fig. 279AC). Ocelli small, sometimes very indistinct 15
15. Genitalia as in Fig. 273AB *australis*
Genitalia not as above 16
16. Genitalia as in Fig. 273C *miripara*
Genitalia as in Fig. 273D *nepotinna*

AUSTRALIS GROUP

The three species in this group are almost uniformly yellowish or yellow-brown in color; they also lack dark faces (except occasional specimens of *A. australis* in which lower half of face is brown),

have small median ocelli, and have 6–7 inner subapical spurs; these spurs are blackish on flat side. The three species are separable mainly on the basis of male genitalia.

Aphonoides australis (Walker), Figs. 273AB, 276TWZ, 277AB, 279AC

Laurepa australis Walker 1869: 98. Holotype ♀, New Holl., BM. Type examined.

Aphonoides lividus Chopard 1951: 508. Holotype ♂, Western Australia (Dr. H. Basedow) AM. Type examined. NEW SYNONYM.

RANGE. Northern Australia from eastern QLD to northwestern WA.

RECOGNITION. Males: Like other two members of group, straw-colored with yellowish legs. Face usually yellow but in some specimens (e.g. from near Kuranda, QLD) lower two-thirds of face, including lower part of frons, brown. Although very similar to *A. miripara* and *A. nepotinna* genitalia are different (Fig. 273AB). A specimen from near Broome, WA, has a dark band running along inner side of Cu₁ vein. Body length to end of HW 16–20 mm; FW length 10–12 mm; femur III length 7.5–9 mm; cercal length 7–9 mm.

Females: Similar to males in size and color. Ovipositor about 0.75 times as long as femur III. Ovipositor as in Fig. 276TW. But a female from near Burketown QLD is different (Fig. 276Z).

HABITAT. Usually collected at lights. Probably lives among tree foliage.

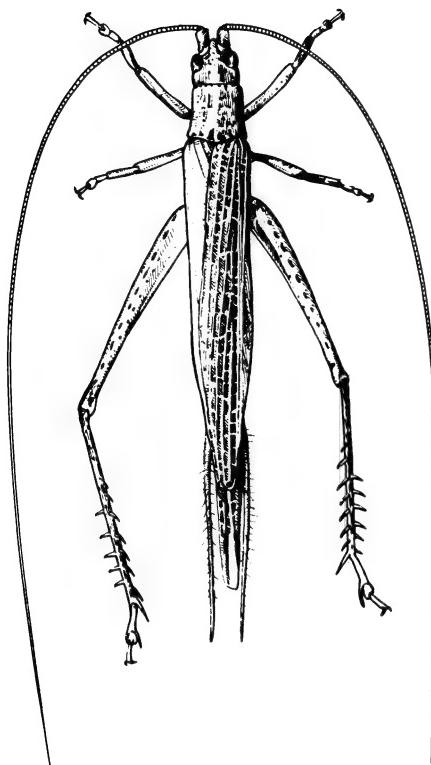
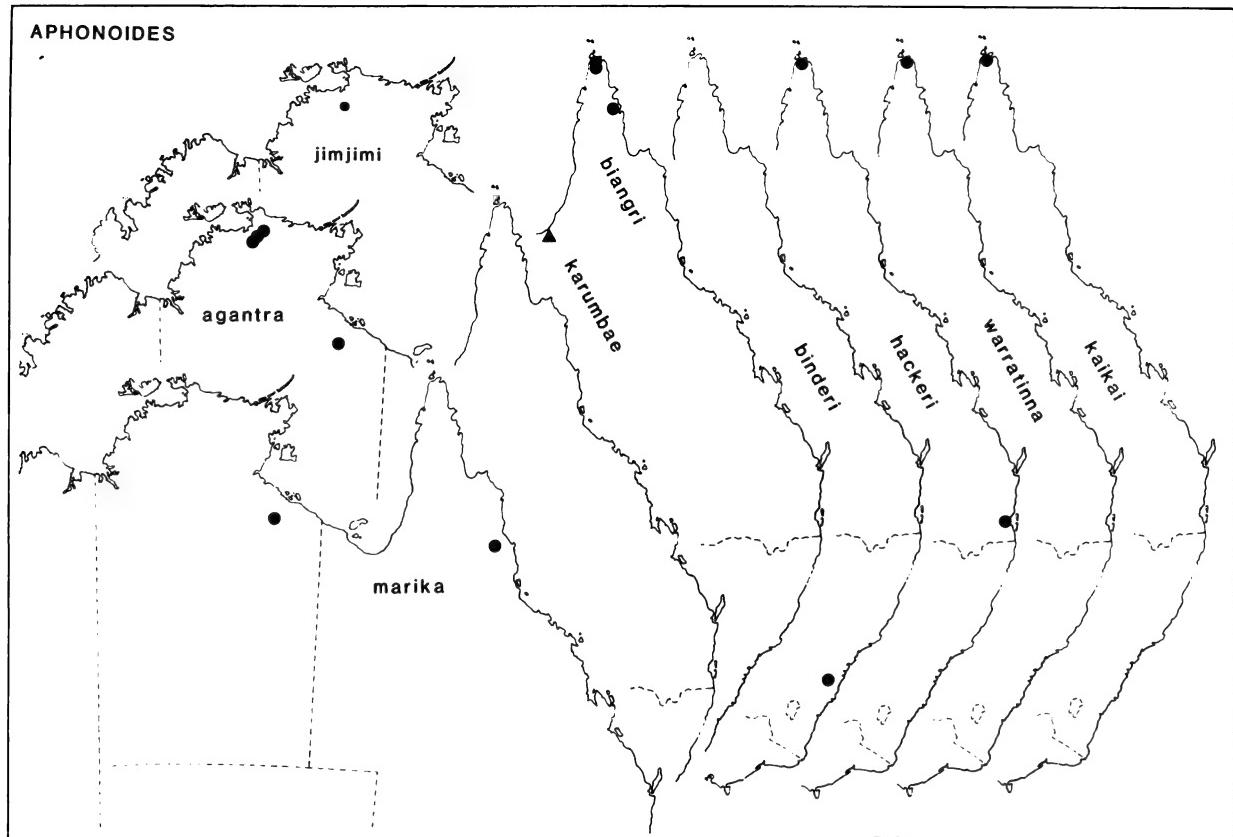


FIG. 270. *Aphonoides angustissimus*.

SPECIMENS. Holotype ♀ BM. WESTERN AUSTRALIA: 25 mi ESE Broome, 16 iv 1963 (Chinnick) 1♂ ANC. Kununurra, 9 iv 1962 (Common) 1♂ ANC. QUEENSLAND: 7 mi SW Mt. Garnet, 20 iv 1969 (Upton) 1♂ ANC. 28 mi W Sarina, 27 iii 1962 (Chinnick, Corby) 1♂ ANC. Davis Creek, near Kuranda, 10 iii

TABLE 29. Comparison of *Aphonoides* species groups.

	FW mottled grey or with dark spots	Face black or with black markings	Number of inner/outer subapical spurs	Epiphallus with thick setae	Median ocellus
Australis Group	no	no	6–7/5	no	very small
Angustissimus Group	no	no	7–8/6–7	no	very small
Debilis Group	no	no	6–7/5	no	medium
Weta Group	no	no	6–7/5	no	large
Weeronga Group	no	no	6/5	no	large
Biangri Group					
Subgroup A	yes	no	5/5		small to obsolete
Subgroup B	yes	yes	5/5	no	small
Subgroup C	yes	yes	5/5	yes	very small to obsolete

FIG. 271. *Aphonoides* distributions.

1956 (Gressitt) 1♂ BISH. Brisbane, 18 iii 1961 (Stevens) 1♂ UQC. Almaden, iv 1928 (Campbell) 1♀ AM. Leichard Falls, 35 mi SE Burketown, 24 v 1972 (Monteith) 1♀ UQC. 15 mi SW Normanton, 25 v 1972 (Monteith) 1♀ UQC. Knob Lagoon, 30 mi NW Doodmidgee Mission, 22 v 1972 (Monteith) 1♀ UQC. Routh Creek, 20 mi E Georgetown, 30 v 1972 (Monteith) 1♂ UQC. Belmont, 10 iv 1959 (Yeo) 1♂ ANC. Magnetic Island, 28 iv 1945 (Sturges) 1♀ UQC. 1 mi N Lawgi, 11 v 1955 (Norris, Common) 1♂ ANC. Lockyerbie, 6–10 vi 1969 (Monteith) 1♀ UQC. Mareeba, 10 iii 1956 (Gressitt) 2♀ BISH. NORTHERN TERRITORY: 7 km NNW Cahills Crossing, East Alligator R, 25 v 1975 (Balderson et al.) 1♀ ANC. WESTERN AUSTRALIA: 17.19S 122.10E, 8 km S Cape Bertholet, West Kimberley dist, 17 iv 1977 (Colless) 1♀ ANC. 25 mi ESE Broome, 16 iv 1963 (Chinnick) 1♂ 1♀ ANC. Kununurra, 9 iv 1962 (Common) 1♂ 1♀ ANC.

Aphonoides miripara n. sp., Figs. 273C, 279B.

RANGE. Northern NT.

RECOGNITION. Males: Almost indistinguishable from *A. australis*, but male genitalia with epiphalllic lobes more closely spaced (Fig. 273C). Crossveins on lateral FW surface distinctly lighter than longi-

tudinal veins and membrane. Body length to end of HW 14–16 mm; FW length ca. 9 mm; femur III length 7–7.5 mm.

HOLOTYPE. ♂, 12.17S 133.13E, 18 km E by N Oenpelli, NT, 1 vi 1973 (Key et al.) ANC.

HABITAT. Not known; collected at lights. Probably inhabiting tree foliage.

SPECIMENS. Holotype ♂ ANC. 16 km E by N Mt. Cahill, NT, 23 v 1973 (Key et al.) 1♂ ANC. Borroloola, NT, 28 ii 1968 (Cantrrell) 1♂ UQC.

Aphonoides nepotinna n. sp., Fig. 273D

RANGE. Type locality near Mt. Garnet, QLD.

RECOGNITION. Body color medium to light brown, legs pale brown. Male genitalia somewhat similar to those of *A. angustissimus* but in other respects more similar to *A. australis*. Center of frons mottled with brown. Front half of FW dorsal field and lateral field with pale crossveins. Body

length to end of HW 16.5 mm; FW length 10.5 mm; femur III lost.

HOLOTYPE. ♂, 7 mi SW Mt. Garnet, QLD, 20 iv 1969 (Common, Upton) ANC.

HABITAT. Not known.

SPECIMENS. Holotype ♂ ANC.

ANGUSTISSIMUS GROUP

The only member of this group is exceptionally slender, has the pronotum longer than wide and has 6–7 outer subapical spurs (includes spur o-4).

Aphonoides angustissimus (Chopard), Figs. 270, 273E, 276P, 279D

Aphonomorphus angustissimus Chopard 1925: 55. Holotype ♂, Yarrabah, QLD (Mjöberg) SM. Transferred to *Aphonoides* by Chopard 1951: 507. Type examined.

RANGE. Northern QLD and NT.

RECOGNITION. Males: Body color very pale brown to yellowish. Dorsum of head and pronotum yellowish, with small reddish spots. Front of pronotal disk with a line of reddish spots. Face mostly pale with several small reddish spots in center. Eyes (side view) with thin reddish horizontal streak. Tibia I with large, oval inner tympanum. Dorsum of FW's with 6 major longitudinal veins between Cu₁ and medial margin. Cu₁ veins with 2 branches. Pronotum longer than wide. Tibia III with 7–8 inner and 6–7 outer subapical spurs. Genitalia as in Fig. 273E. Body length to end of wings ca. 16 mm.

Females: Similar to male. Ovipositor ca. 5 mm; body length ca. 14 mm with FW's.

HABITAT. Not known. Its slender body suggests that it may inhabit grasses.

SPECIMENS. Holotype ♂ SM. QUEENSLAND: Lockerbie, Cape York, 10–15 vi 1969 (Monteith) 2♀ uQC. Bamaga, Cape York, 15–18 vi 1969 (Monteith) 1♂ uQC. Mingela, 21 iv 1955 (Norris, Common) 1♂ ANC. Port Douglas, 15 i 1962 (Britton) 1♀ BM. Cairns (Illingworth) 1♂ 1♀ BISH. Between Massey Creek and Rocky River, 30 iv 1961 (Gressit) 1♂ BISH. Near Kuranda, 17 i 1962, 1♂ BM. Gordonvale, vii, 2♂ BISH. 3 mi N Bundaberg, 19–21 iv 1971 (Frauca) 1♀ ANC. Gregory River, S of Bundaberg, v 1971 (Frauca) 2♀ ANC. NORTHERN TERRITORY: 12.06S 133.04E, Cooper Creek, 19 km E by S Mt. Borradale, 1 vi 1973 (Key) 1♀ ANC. Katherine, 17 iv 1962 (Common) 1♀ ANC. Koon-garra, 15 km E Mt. Cahill, 31 x 1972 (Ingle) 1♂ ANC. Darwin, 29 iii 1972 (Bolton) 1♂ ANC. 18 km E by N Oenpelli, 1 vi 1973 (Key et al.) 1♂ ANC.

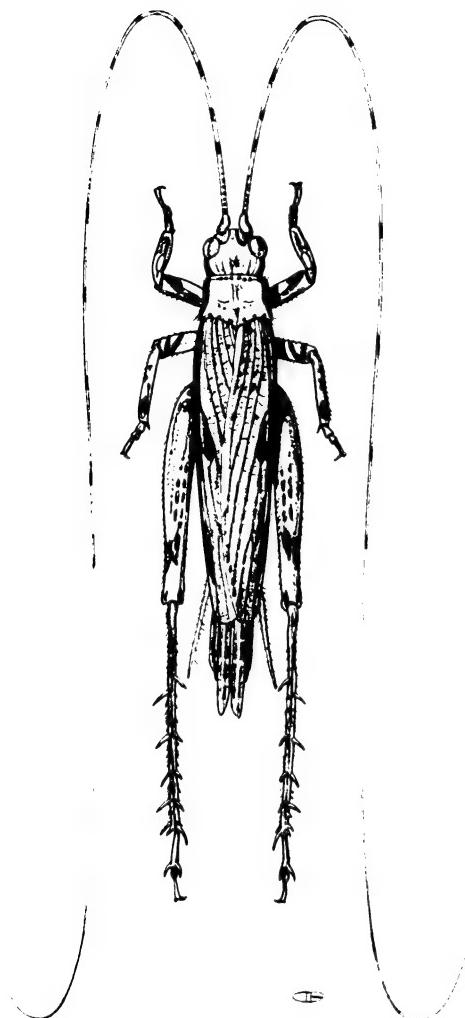


FIG. 272. *Aphonoides biangri*.

DEBILIS GROUP

This group of two species usually possesses the following combination of characteristics: FW's brown to grey-brown. Face uniformly brownish or yellowish. Pronotal disk with 2 brown spots near center (Fig. 277F). Legs largely of one color, and pale brown to yellowish. Ocelli well-developed with at least some black pigmentation behind each.

The two species in the group may be separated by the male genitalia (see also key to genus).

Aphonoides debilis (Chopard), Figs. 268, 274ABC, 277F, 279E

Aphonomorphus debilis Chopard 1925: 54. Holotype ♂, Malanda, QLD (Mjöberg) SM. Incorrectly synonymized by Chopard 1951 under *Aphonoides australis*. Type examined.

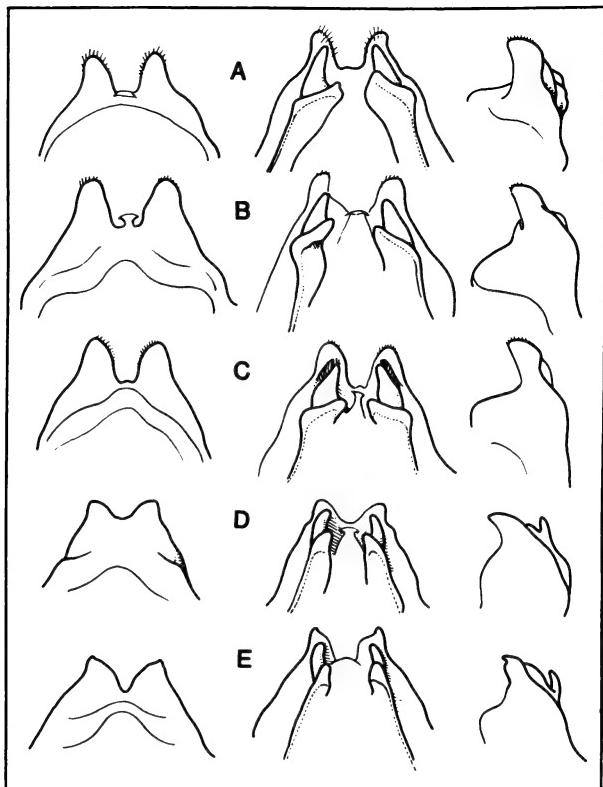


FIG. 273. *Aphonooides* male genitalia: Australis and Angustissimus groups (dorsal, ventral and lateral views). A, *australis* 25 mi ESE Broome; B, *australis* Sarina; C, *miripara* 18 mi E Oenpelli; D, *nepotinna* 7 mi SW Mt. Garnet; E, *angustissimus* 18 km E Oenpelli.

RANGE. Mountain forests of eastern QLD.

RECOGNITION. Males: Body color grey-brown. Dorsum of head slightly pigmented behind ocelli. Pronotal disk with brown mark in left and right halves. Face pale. FW's pale brown, major veins slightly darker, many crossveins white. Beginnings of Cu, branches sometimes pale. Legs I and II spotted. Tibia III with 5 outer and 6 inner subapical spurs. Body length to end of HW 16.5–18.5 mm; femur III length 7–8 mm.

HABITAT. Rain forest and mesic mountain forests.

SPECIMENS. Holotype ♀ BM. QUEENSLAND: Malanda, 1♂ SM. 1 mi N Kuranda, 1200 ft, 23 iv 1969 (Common, Upton) 2♂ 1♀ ANC. Mt. Edith, 4–7 mi off Danbulla Rd, 27 iv 1967 (Colless) 1♂ ANC. Kuranda, 13 iii 1956 and 6 v 1961 (Gressitt) 1♂ 2♀ BISH. Birthday Creek, via Paluma, 4 i 1973 (Cantrell) 1♂ uQC. 4 mi N Daintree, 29 x 1966 (Britton) 1♀ ANC. 4 mi W Babinda, 10 vii 1964 (Common, Upton) 1♂ ANC. Palmerston National

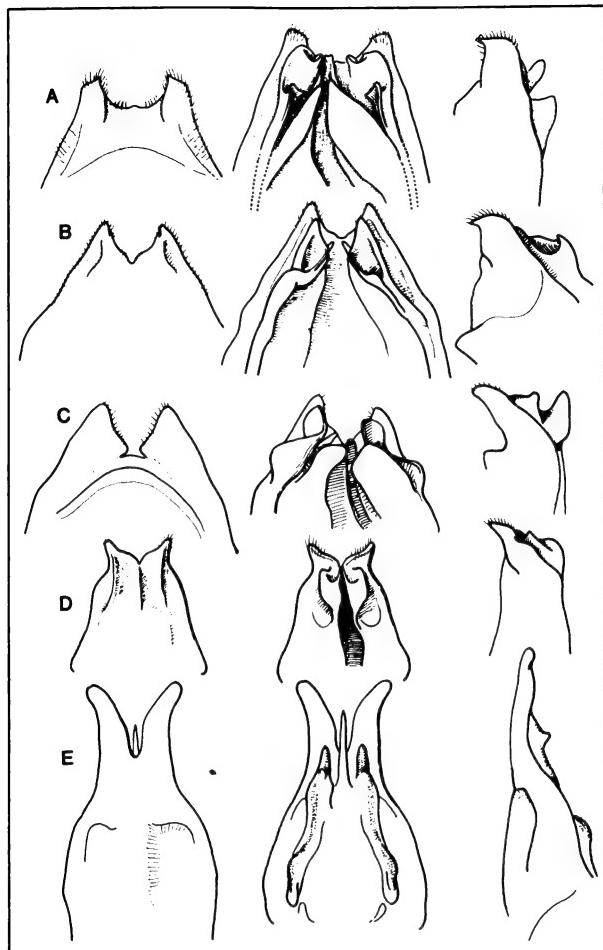


FIG. 274. *Aphonooides* male genitalia. Debilis, Weta and Weeronga groups. A, *debilis* Millaa Millaa; B, *debilis* Birthday Creek; C, *debilis* Cairns; D, *weta* holotype; E, *weeronga* holotype.

Park, W of Crawfords Lookout, 5 xi 1966 (Britton) 1♀ ANC. 25.58S 133.07E, near Poona Lake, Cooloola National Park, 4 iv 1978 (Rentz) 2♀ ANC. Millaa Millaa Falls, via Millaa Millaa, 10–11 xii 1966 (Cantrell) 1♂ uQC.

Aphonooides lowanna n. sp., Figs. 276Y, 279F

RANGE. Type locality in Atherton region of QLD.

RECOGNITION. Females: Body color brown with white spots along dorsolateral margins of FW's. Dorsum of head reddish-brown. Antennal scape and second antennal segment reddish-brown, remaining portion of antenna mostly pale but with periodic dark rings. Face mostly yellowish, reddish near top of frons. Eyes unbanded. Side of head yellow to brown. Lateral pronotal lobes same color as

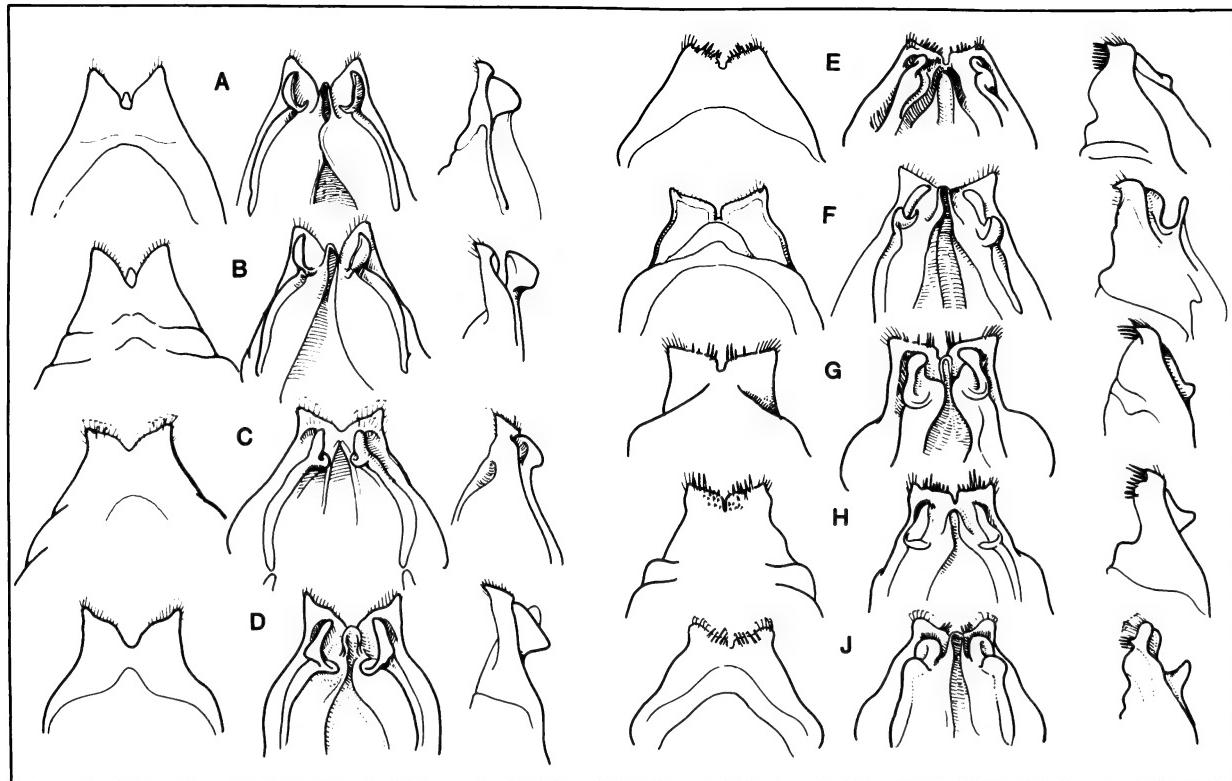


FIG. 275. *Aphonoides* male genitalia. Biangri Group. A, *biangri* holotype; B, *biangri* Bamaga; C, *kaikai* Lockerbie Scrub; D, *warratinna*; E, *agantra* Mt Cahill area; F, *hackeri* Lockerbie; G, *marika* Stannery Hills; H, *binderi* holotype; J, *jimjimi* holotype.

disk. Drop-shaped markings on pronotal disk ringed with thin pale line. FW's brown, major veins about same color as membrane. Lateral field of FW with 4 oblique pale spots; the spots include bases of the Cu₁ branches and a small part of membrane on either side. FW with 8 major veins between Cu₁ and lateral margin. Cu₁ with 3 branches. Legs I and II more or less unicolorous light brown, with faint traces of banding; middle tarsal segment and end of third tarsal segment dark brown. Femur III unicolorous red-brown. Tibia III with dark marks around bases of subapical spurs and with dark patch on side next to apical spurs; with 5 outer and 6 inner subapical spurs. Cerci with irregular dark markings. Body length 10 mm; with wings 16.3 mm; femur III 7 mm; cerci 6.5 mm; ovipositor 5.5 mm.

HOLOTYPE. ♀, 17 miles south of Atherton, QLD, 3000 ft, 19 iii 1964 (I. F. B. Common and M. S. Upton) ANC.

HABITAT. Foliage of forest trees.

SPECIMENS. Holotype ♀ ANC.

WETA GROUP

This group includes one species and is distinguished from all other *Aphonoides* in having the dorsum of the rostrum black. The face is mostly pale but has a dark median streak at the upper side of the frons. Genitalia as in Fig. 274D.

***Aphonoides weta* n. sp., Figs. 274D, 276A', 279G**

RANGE. Type locality at tip of Cape York Peninsula.

RECOGNITION. Males: Similar to *Lividus* Group but with black rostrum (Fig. 279G). Body color yellow-orange. Dorsum of head black from between eyes to front of rostrum. Dorsum of basal antennal segments yellow-orange. Face mostly yellowish but with dark band descending face from top of rostrum, becoming narrower and disappearing in middle of frons. Ocelli very large and white against surrounding blackness. Side of head yellowish. Pronotum unicolorous, slightly darker on top. Cu₁ vein with 2 branches. Dorsum of FW with 6 veins

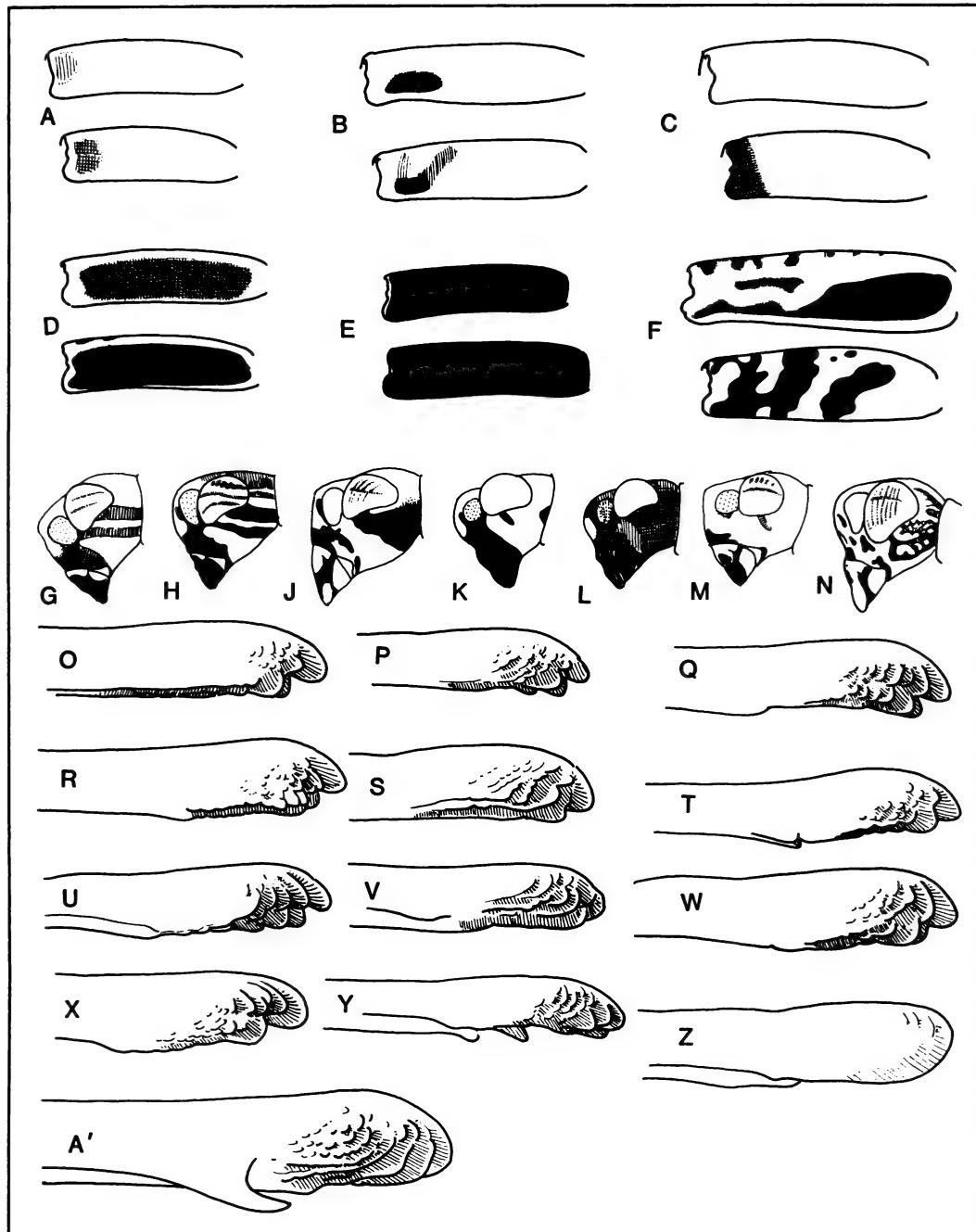


FIG. 276. *Aphonoides*. A–F, inner femur I (above) and femur II (below): A, *jimjimi*; B, *hackeri*; C, *kaikai* and *warratinna*; D, *marika*; E, *binderi*; F, *agantra*. G, *hackeri* Lockerbie; H, *agantra* Mt Cahill area; J, *karumbae* holotype; K, *marika* Stannery Hills; L, *binderi*; M, *jimjimi* holotype; N, *biangri* holotype. O–A', ovipositor ends: O, *marika* Borroloola area; P, *angustissimus* Lockerbie; Q, *kaikai* Bamaga; R, *agantra* near Mt Cahill; S, *karumbae* holotype; T, *australis* Magnetic Island; U, *biangri* Lockerbie; V, *warratinna* holotype; W, *australis* near Normanton; X, *binderi*; Y, *lowanna* holotype; Z, *australis* near Burketown QLD; A', *weta* Lockerbie.

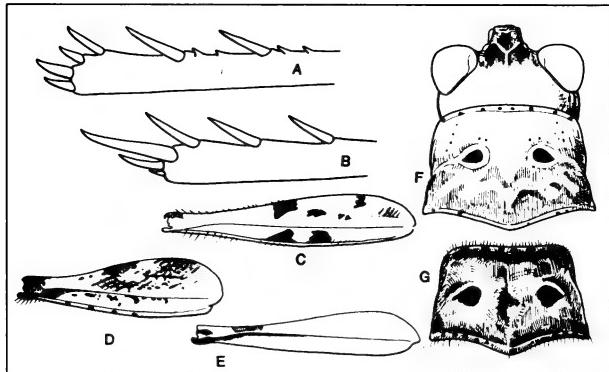


FIG. 277. *Aphonoides*. A, *australis* tibia III outer; B, *australis* tibia III inner; C, *kaikai* holotype; D, *biangri* Jardine R.; E, *hackeri* Lockerbie; F, *debilis*; G, *kaikai*.

between Cu₁ and medial margin. Tibia III with 6–7 inner and 5 outer subapical spurs. Genitalia as in Fig. 274D. Body length 12 mm, with wings 17.3 mm.

Females: Coloration similar to male. Antennal scape mostly dark brown above and pale below. Face pale. Tibia III with dark brown between the spines and spurs. Bases of spurs blackish. Body length 14 mm, to end of wings 23 mm; femur III 11 mm; tibia III 10.3 mm; ovipositor 11.5 mm.

HOLOTYPE. ♂, Lockerbie Scrub, Cape York, QLD, 14–18 iv 1973 (G. B. Monteith) UQC.

HABITAT. Not known; probably lives in the foliage of trees.

SPECIMENS. Holotype ♂ UQC. Same place as holotype, 10–15 vi 1969 (Monteith) 1♀ UQC.

WEERONGA GROUP

This group, which includes but one species, possesses the following combination of characteristics: FW's greyish, remainder of body somewhat orange-brown. Face pale yellowish. Side of head and entire pronotum unicolorous. Crossveins on dorsum of FW's darker than membrane. Femur III unicolorous orange. Eyes in side view with horizontal dark streak.

Aphonoides weeronga n. sp., Figs. 274E, 279H

RANGE. Type locality in Iron Range, Cape York, QLD.

RECOGNITION. Males: FW's greyish, head and pronotum orange, legs, yellow-orange. Dorsum of

head mostly orange, darker on rostrum. Front of rostrum as wide or slightly wider than antennal scape. Eyes in side view with horizontal reddish streak around eye just about middle. Median ocellus almost on a line running between fronts of lateral ocelli. Face pale, yellowish. Side of head orange. Pronotum uniform orange, but with small brown mark at anterior margin of juncture of disk and lateral lobes. FW's greyish-brown, crossveins (in posterior half, mainly) dark. Front of FW's with dark streak between M and Cu₂. Cu₁ branches twice—once in first quarter, once in second quarter. Dorsum of FW's with 7 major veins between Cu₁ and medial margin. Legs uniformly orange. Tibia I with large, oval inner tympanum. Tibia III with 5 outer and 6 inner subapical spurs; spurs darkly pigmented at base; tibia with dark spot on posterior side about 2 tibial diameters from femur. Genitalia as in Fig. 274E. Body length 14 mm, with FW's 19 mm; femur III 7.5 mm; tibia III 6.5 mm.

HOLOTYPE. ♂, Iron Range, Cape York, QLD, 26–31 v 1971 (G. B. Monteith) UQC.

HABITAT. Probably foliage of forest trees.

SPECIMENS. Holotype ♂ UQC.

BIANGRI GROUP

The ten members of this group have a grey or grey-brown mottled appearance. Some have rather strongly banded faces and all have only 5 (rarely 6) inner subapical spurs (including spur i-4). The male genitalia are rather similar.

Subgroup A (*biangri*, *karumbae*)

1. Face variegated black and pale (Fig. 278AC).
2. Male epiphallus without thickened setae.
3. Ocelli small.

Subgroup B (*agantra*, *hackeri*, *marika*, *binderi*, *jimjimi*)

1. Face usually blackish, but pale above (Fig. 278D–G) (but A. *jimjimi* lighter—Fig. 278B).
2. Male epiphallus usually with thickened setae.
3. Ocelli small to obsolete.

Subgroup C (*kaikai*, *warratinna*)

1. Face pale.
2. Male epiphallus without thickened setae.
3. Ocelli small to obsolete.

Aphonoides biangri n. sp., Figs. 272, 275AB, 276NU, 277D, 278A

RANGE. Northern Cape York, QLD.

RECOGNITION. Males: Body color mottled grey-brown. Dorsum of head mostly pale brown but with

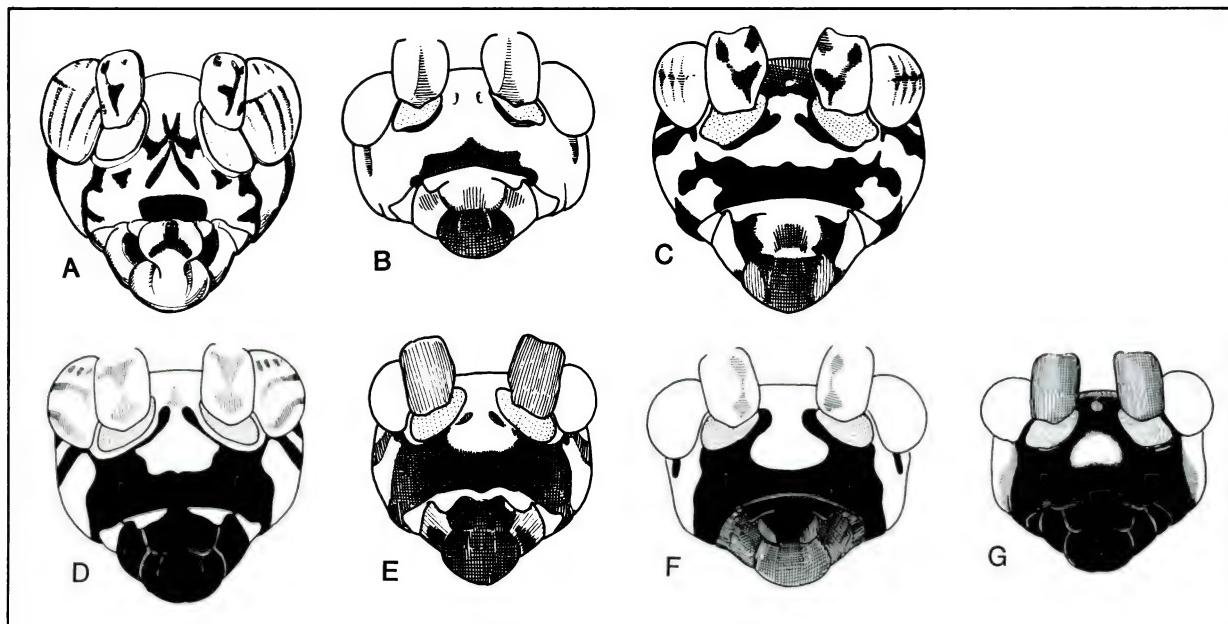


FIG. 278. *Aphonooides*. A, *biangri* Jardine R; B, *jimjimi* holotype; C, *karumbae* holotype; D, *agantra* near Mt Cahill; E, *hackeri* Lockerbie; F, *marika*, Stannery Hills; G, *binderi* holotype.

numerous brown spots and with dark lines from back of eyes to pronotum. Face with large black markings (Fig. 278A). Side of head with irregular network of dark lines (Fig. 276N). Eyes with a series of dorso-ventral bands. Pronotal disk mostly pale brown but spotted. Lateral lobes banded longitudinally—with broader band along upper side and two narrower rather indistinct bands below. FW's grey-brown, with major veins darker than membrane and some crossveins very pale. Lateral field of FW with dark area between radius and subcosta, which is interrupted by pale crossveins. Legs strongly spotted, femur III as in Fig. 277D. Tibia I with groove where outer tympanum would lie and large oval inner tympanum. Tibia III with 3 broad dark bands (in length ca. 3 times tibial width), one near center, one at distal end, and one about 1.5 tibial widths away from femur III. Tibia III with 5 inner and 5 outer subapical spurs; spurs pale. Genitalia as in Fig. 275A. Holotype measurements: Body length 10 mm, with wings 16 mm; femur III 6.7 mm; tibia III 6.5 mm.

VARIATION. In a male from Lockerbie, QLD, top of head mostly dark brown, banded on occiput and with narrow pale band connecting medial surfaces of eyes; FW's becoming much darker just medial

to Cu₁ vein; several crossveins in this dark area yellow. Femur III nearly unicolorous. In a male from Bamaga, QLD, dorsum of head with reticulate network of brown lines; eyes more strongly banded (Fig. 279J); side of femur III less strongly marked than Fig. 277D.

HOLOTYPE. ♂, Jardine River, Cape York, QLD, 15–17 vi 1969 (G. Monteith) UQC.

HABITAT. Foliage of trees.

SPECIMENS. Holotype ♂ uqc. QUEENSLAND: Lockerbie, Cape York, 10–15 vi 1969 (Monteith) 1♀ uqc. Lockerbie Scrub, 14–18 iv 1973 (Monteith) 1♂ uqc. Bamaga, Cape York, 15–18 vi 1969 (Monteith) 1♂ uqc. Iron Range, Cape York, 12 vii 1968 (Le Souef) 1♀ ANC.

***Aphonooides karumbae* n. sp., Figs. 276JS, 278C, 279K**

RANGE. Type locality at lower end of Gulf of Carpentaria.

RECOGNITION. Females: Body color speckled grey, white, and black. Dorsum of head mottled, largely dark from middle of eyes to front of rostrum; broadly concave between eyes and behind lateral ocelli, and with silvery, shining setae. Antennae banded with black (several segments forming a dark band). Face with strong band across lower frons.

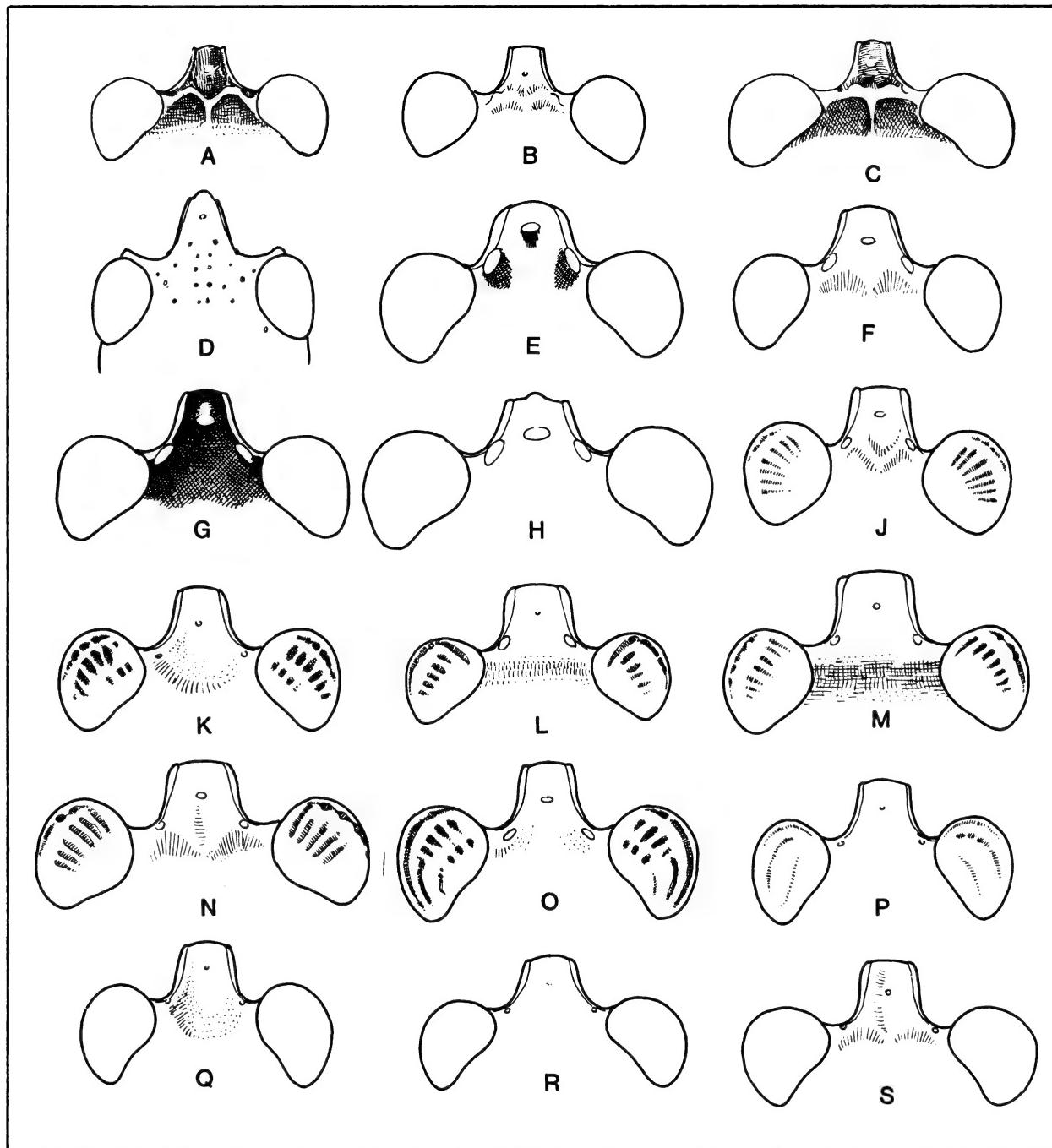


FIG. 279. *Aphonoides* front of head. A, *australis* Borroloola; B, *miripara* holotype; C, *australis* Brisbane; D, *angustissimus*; E, *debilis*; F, *lowanna* holotype; G, *weta* holotype; H, *weeronga* holotype; J, *biangri* holotype; K, *karumbae* holotype; L, *kaikai* holotype; M, *warratinna*; N, *warratinna* holotype; O, *agantra* holotype; P, *hackeri*; Q, *binderi* holotype; R, *jimjimi*; S, *marika* holotype.

Side of head mostly black behind a line running from front lower corner of eye to base of maxillary palp. Pronotum with irregular surface, a pit at junction of disk and lateral lobes and medial pit just behind middle. Pronotal disk with numerous irregular dark spots; lateral lobes with black band along upper side. Margins and surface with shiny, almost silvery setae. FW as in *A. wininarus*—major veins black but bordered with narrow pale lines; cross-veins pale where they join major veins and dark in between. FW membrane light in some places dark in others; largest dark areas located between Cu₁ and its first branch. Subcosta vein and its branches, and radius pale above dark below. Area between subcosta and radius in middle of second half with large pale patch. Distal part of FW between radius and media black. All legs strongly marked with black patches and covered with pale silvery setae. Tibia III with 5 inner and 5 outer subapical spurs. Cerci pale beneath, spotted on top. Body length 11.6 mm, with wings 17 mm; femur III 8.5 mm; tibia III 8 mm; cerci 7 mm; ovipositor 6.5 mm.

HOLOTYPE. ♀, Walker Creek, 25 miles SE of Karumba, QLD, 28 v 1972 (G. B. and S. R. Monteith) UQC

HABITAT. Foliage of trees along water course.

SPECIMENS. Holotype ♀ UQC.

***Aphonoides agantra* n. sp., Figs. 275E, 276FHR, 278D, 279O**

RANGE. Northern NT.

RECOGNITION. Males: Face largely black, but with white markings as in Fig. 278D. Side of head with two black stripes behind eyes, similar to *A. hackeri* (Fig. 276H). Eyes with distinct lateral dark stripes (Fig. 279O). Lateral lobes of pronotum blackish along upper side. Inner face of femur I mostly black in basal half and along lower inner face. Inner face of femur II with 3 broad black bands in distal half (Fig. 276F). Dorsum of FW with grey, black, and ivory. Largest dark marking located in smaller angle formed by Cu₁ vein and its first branch, and in adjacent cells; immediately behind this is a pale ivory area. In one male from near Mt. Cahill, NT, entire dorsal field blackish, except for pale area around second Cu₁ branch. Lateral field of FW mostly pale grey but with a longitudinal black streak running between Sc and R veins; in

distal quarter this black streak crosses over R vein and runs between R and M veins. Femur III with oblique streaks of black and a long thin black line dividing top two-thirds from bottom third. Tibia III mostly dark but spurs whitish, with 5 inner and 5 outer subapical spurs (includes i-4 and o-4). Body length to end of HW 16–17 mm; FW length 10–10.5 mm; femur III length 8–9 mm.

Females: Similar to males except larger. Body length to end of HW 19–20 mm; FW length 11–12 mm; femur III length 8.5–9 mm; ovipositor length 6.5–7 mm.

HOLOTYPE. ♂, 12.52S 132.50E, 15 km E of Mt. Cahill, NT, 7 iii 1973 (Key et al.) ANC.

HABITAT. Foliage of trees along water courses.

SPECIMENS. NORTHERN TERRITORY: Holotype ♂ ANC. Same data as holotype, 1♂ 2♀ ANC. 10 km E by N of Mt. Cahill, 22 v 1973 (Key et al.) 5♂ 3♀ ANC. 12.31S 132.54E, 9 km N by E of Mudginbarry HS, 10 vi 1973 (Upton, Feehan) 1♂ ANC. 14 km S by E Mudginbarry HS, 12 vi 1973 (Upton, Feehan) 1♂ ANC. 15 km E Mt. Cahill, 12 vi 1973 (Upton, Feehan) 1♂ ANC. 6 km S Oenpelli, 6 vi 1973 (Upton, Feehan) 1♀ ANC. Caranbirini Waterhole, 33 km SW Borroloola, 21 iv 1976 (Key et al.) 1♀ ANC.

***Aphonoides hackeri* Chopard, Figs. 275F, 276BG, 277E, 278E, 279P**

Aphonoides hackeri Chopard 1951: 510. Holotype ♂, Brisbane, QLD, 13 iii 1918 (Hacker) QM. Type examined.

RANGE. Extreme southeastern QLD and tip of Cape York.

RECOGNITION. Males: Dorsum of head with 3 faint darker bands at back of head. (These largely disappeared when specimen was relaxed with ammonia, as have dark spots on pronotum.) Face and cheeks marked as in Figs. 278E, 276G. Pronotal disk mostly pale with dark spots along front and back margins. Lateral lobes with dark brown band taking up most of upper half. This band almost lacking in one male. Dorsum of FW's with large dark patch in angle between Cu₁ and its first branch. Side of FW with dark brown band along dorsal surface between Sc and R veins and below Sc vein. Legs I with large, oval inner tympanum. Legs I and II banded (Fig. 276B). Femur III banded as in Fig. 277E. Tibia III with 5 inner and 5 outer subapical spurs. Tibia III banded as follows: brown beneath, dark brown along lower side, white along spines and dark on top between spines. Spurs very pale.

Cerci white. Genitalia as in Fig. 275F. Body length ca. 11.5 mm, with wings 16 mm; femur III 7.5 mm; tibia III 7.2 mm; cerci (now lost) 6 mm.

HABITAT. Foliage of trees.

SPECIMENS. Holotype ♂ QM. Lockerbie, Cape York, QLD, 10–15 vi 1969 (Monteith) 2♂ UQC.

Aphonoides marika n. sp., Figs. 275G, 276DKO, 278F, 279S

RANGE. Northeastern QLD to northeastern NT.

RECOGNITION. Males: Face and side of head as in Figs. 278F, 276K. Lateral lobe grey, spotted, without dark band along top. FW marked much like *A. agantra*. Inner faces of femora I and II entirely dark (Fig. 276D). Male genitalia as in Fig. 275G. Cerci pale grey. Body length to end of HW 18 mm; FW length 11 mm; femur III length 8.2 mm; cercal length ca. 7 mm.

Females: Coloration similar to males. Body length to end of HW 19 mm; FW length 12 mm; femur III length 8.5 mm; ovipositor 7.3 mm.

HOLOTYPE. ♂, Stannary Hills, 11 km S by W of Mutchilba, QLD, 26 v 1977 (Common, Edwards) ANC.

HABITAT. Foliage of trees in open savanna and water courses.

SPECIMENS. Holotype ♂ ANC. Caranbirini Waterhole 33 km SW of Borroloola, NT, 21 iv 1976 (Key et al.) 1♀ ANC.

Aphonoides jimjimi n. sp., Figs. 275J, 276AM, 278B, 279R

RANGE. Type locality in extreme northern NT.

RECOGNITION. Males: Pale grey-brown insect. Face dark brown on lower central frons, lower lobe of clypeus, and labrum. Side of head yellowish to greyish, with two very indistinct horizontal bands extending between back of eye and pronotum. Pronotal disk same color as lateral lobes and with small black spots. Dorsum of FW's largely light grey-brown with a few ivory crossveins; lateral field largely pale grey with brown veins. Region between Sc and R veins pale grey but border of R vein with black streak. Inner face of femur I almost entirely pale grey. Inner face of femur II pale grey but becoming darker brown distally. Genitalia as in Fig. 275J. Body length to end of HW 15.3 mm; FW length 11 mm; femur III length 8 mm; cercal length ca. 6 mm.

HOLOTYPE. ♂, 12.57S 132.33E, Jim Jim Creek, 19 km WSW Mt. Cahill, NT, 17 vi 1973 (Upton et al.) ANC.

HABITAT. Foliage of trees.

SPECIMENS. Holotype ♂ ANC.

Aphonoides binderi n. sp., Figs. 275H, 276ELX, 278G, 279Q

RANGE. Type locality just south of Sydney, NSW.

RECOGNITION. Males: Body dark, sooty colored. Face and side of head largely black. Pronotum entirely blackish. Entire FW dark; lateral field sooty but black between Sc and R veins. Inner faces of femora I and II black. Tibiae I and II black. Femur III largely dark grey to black. Tibia III black except for spurs which are tipped pale. Body length to end of HW 15.5 mm; FW length 10 mm; femur III length 7.5 mm.

Females: Similar to male in color. Body length to end of HW 17 mm; FW length 10.5 mm; ovipositor length 5 mm.

HOLOTYPE. ♂, Tahmoor, near Picton, NSW (M. I. Nikitin) BM.

HABITAT. Not known; probably tree foliage in eucalyptus forests.

SPECIMENS. Holotype ♂ BM. Same data, ♀ BM.

Aphonoides kaikai n. sp., Figs. 275C, 276CQ, 277CG, 279L

RANGE. Northern Cape York Peninsula.

RECOGNITION. Males: Face pale. Body color mottled-brown. Median ocellus very small, scarcely visible (Fig. 279L). Top of eyes banded (Fig. 279L). Pronotal disk light brown and somewhat spotted; middle of disk with two large black spots halfway between median line and lateral edges. Background color of FW's dark brown, but spotted with lighter and darker markings; two elongated light spots in middle of FW at lateral margin lie in adjacent branches of Cu₁ vein. Legs I and II laterally flattened, mottled brown, with white bristles. Femur III marked as in Fig. 277C. Tibia III flattened on posterior face, with 5 inner and 5 outer subapical spurs. Tibia with 4 dark patches on posterior surface—two in proximal and two in distal half. Genitalia as in Fig. 275C. Body length 11.3 mm, to end

of wings 16 mm; femur III 8.5 mm; tibia III 8.2 mm; cerci 7.0 mm.

Females: Similar to male. Body length to end of HW 19 mm; FW length 12.5 mm; femur III length 9 mm; ovipositor length 6 mm.

HOLOTYPE. ♂, Lockerbie Scrub, Cape York, QLD, 19–22 iv 1973 (G. B. Monteith) UQC.

HABITAT. Not known; probably tree foliage.

SPECIMENS. Holotype ♂ UQC. Bamaga, Cape York, QLD, 4 iv 1964 (Common, Upton) 1♀ ANC.

Aphonoides warratinna n. sp., Figs. 275D, 276DV, 279MN

RANGE. Tip of Cape York Peninsula and doubtfully, southwestern WA. This seems an odd and unlikely distribution. A male was labelled by Gressitt and Gressitt from Lake Grace, WA. Since the holotype female and the only male are morphologically so similar and because the genus is known only from extreme northern Australia we believe the male is mislabelled. We are therefore making the female the holotype.

RECOGNITION. Females: Body color slightly mottled grey-brown. Dorsum of head mottled grey, somewhat concave along a line joining median surfaces of eyes. Top of eyes marked as in Fig. 279M. Face mostly pale, but with 4 small black spots, two on frons between antennae and a pair directly below this in middle of frons. Disk profusely spotted and with larger spots along top front margin. FW's mottled pale brown, dark brown, and white. Main veins blackish centrally and bordered on either side with a narrow yellow line. Crossveins pale where they join main veins, darker in between. At junction of Cu₁ and its branches FW with prominent white patches (veins themselves pale in this region). Cu₁ with 4 branches. Area between Sc and R with a dark band interrupted by pale crossveins. Femora I and II with rows of dark spots on outer face. Tibia I spotted on leading edge, without outer tympanum and with large oval inner tympanum (twice as long as wide). Femur II with black band on inner face at distal end. Tibia II with black band around proximal end. Legs I and II with numerous white setae. Femur III mottled grey—with two rows of black marks along top face (lateral row more prominent), and with a pale streak outside and adjacent to lateral row. Tibia III with numerous small black spots along posterior surface and with a larger black

patch on side of tibia next to apical spurs. Tibia with 5 outer and 5–6 inner subapical spurs. Body length 12.5 mm, with wings 19 mm; femur III 9 mm; tibia III 9 mm; ovipositor 6.3 mm.

Males: Very similar to female in color. Genitalia as in Fig. 275D. Body length to end of HW 19 mm. FW length 13 mm; femur III length 9 mm.

HOLOTYPE. ♀, Lockerbie, Cape York, QLD, 6–10 vi 1969 (G. B. Monteith) UQC.

HABITAT. Not known.

SPECIMENS. Holotype ♀ UQC. (Lake Grace, WA, 12 xi 1963 (L. and M. Gressitt) 1♂ BISH—this locality is probably an error in labelling.)

UMBULGARIA n. gen.

TYPE SPECIES: *Umbulgaria ita* n. sp.

This genus is named after Wally Umbulgari of Wyndham, in admiration of his proficiency on the didgeridoo. This genus, presently comprised of 3 species, is most similar to the genera *Aphonoides* and *Hemiphonus*. Some species of *Hemiphonus* are superficially very similar to *Umbulgaria* (e.g. *H. brunneovariegatus* and *H. quinnia*) but the similarity is almost certainly owing to convergent evolution.

RECOGNITION. Fig. 280. The genus possesses the following combination of characteristics which may be used to separate it from other genera: Males without stridulum (unlike *Hemiphonus*, *Riatina*, and *Madasumma*). Auditory tympana on both inner and outer faces; inner opening much larger than outer (unlike *Aphonoides*). M and R veins of FW not partially fused (unlike *Hemiphonus*). Pronotal disk extremely broad and broadly rounded along transverse axis, and lateral lobes very narrow and hidden from top view (unlike *Mundeicus*). Lateral pronotal lobes convex (top view). Legs I and II laterally flattened, especially in femora I and II, and tibia II (some *Aphonoides* similar). Genitalia symmetrical (unlike *Hemiphonus* and *Mundeicus*). (See also Key, and discussion of *Dolichogryllus* under *Hemiphonus*.)

KEY TO UMBULGARIA SPECIES

1. Pronotal disk without numerous dark spots *hillimunga*
Pronotal disk with many dark spots, especially along front and hind margins 2

2. Rostrum mostly dark brown to black. Genitalia as in Fig.
 282A *obscura*
 Rostrum with dark brown to black patches, but not mostly dark. Venter of antennal scape pale. Genitalia as in Fig. 282B *ita*

***Umbulgaria ita* n. sp., Fig. 282BC**

RANGE. Extreme northern Cape York.

RECOGNITION. Males: Body color grey-brown, somewhat streaked. Sides of pronotum convex. Dorsum of head very faintly banded on occiput; slightly concave between eyes and behind lateral ocelli. Median ocellus as large as lateral ones. Ocelli with black marks along their posterior medial borders. Rostral width (at apex) 0.63 times width of antennal scape. Face pale, yellowish. Side of head pale. Disk of pronotum very broad, rounded along transverse axis; lateral lobes very low, not visible from above; lateral margins of pronotum (top view) convex. Disk also irregularly spotted, with black spots along front and rear margins, with two parallel dark lines along median line, and with sparse covering of fine silvery pubescence. FW covered with close mat of fine white or light grey pubescence. Main veins appear dark against general light grey background. Toward distal end of FW, cells have medial dark streaks. Cells behind bases of 4 central Cu₁ branches mostly dark brown, causing FW to be spotted along margins of dorsal field. Dorsal field with 12 veins which are irregularly parallel. Cu₁ vein with 8 branches. Lateral field with black line along dorsum between Sc and R veins, this line especially prominent in first half. Sc vein with about 12 branches. HW's extend beyond FW's. Femur I laterally flattened, pale grey-brown, spotted, slightly flattened on top at distal end. Tibia I somewhat triangular, flat on sides and front, rounded in back, with a small oval outer tympanum and large elongated inner tympanum. Legs I and II with scattered white hairs. Leg II laterally flattened; femur II with a large black mark on distal internal surface; outer surface spotted and with small transverse band at lower margin, last 4th; tibia II (external face) with black crescent across first 4th and mostly black in distal 3rd on internal surface. Tarsi I and II mostly dark brown to black, especially on dorsum. Femur III with several low longitudinal ridges along top outer face; mostly grey-brown, finely speckled. Inner side of knee black. Tibia III somewhat triangular, flattened on posterior side; with 4 inner and

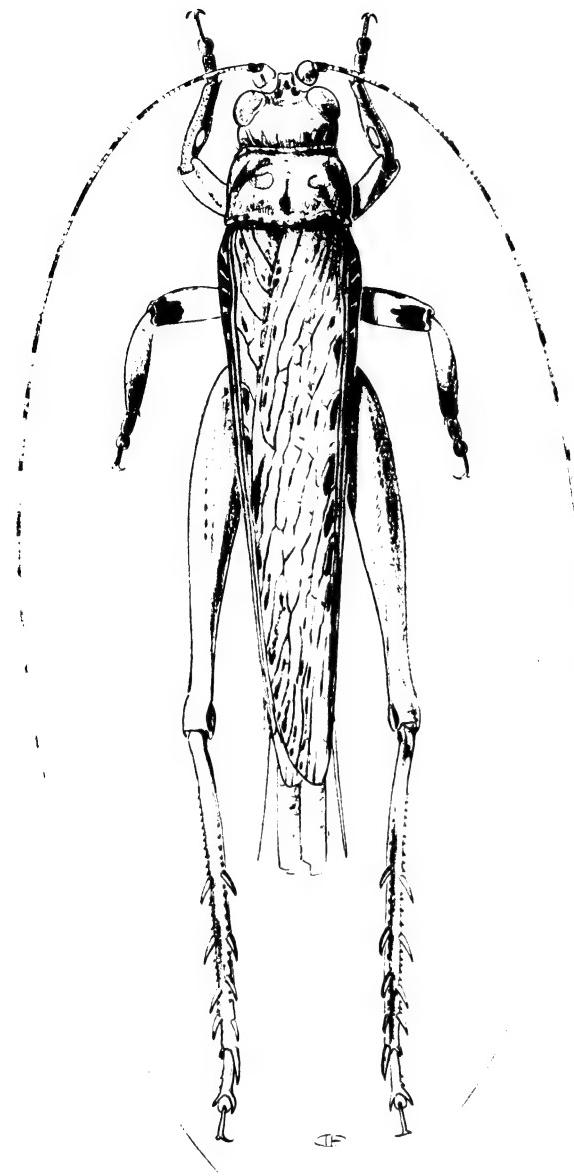
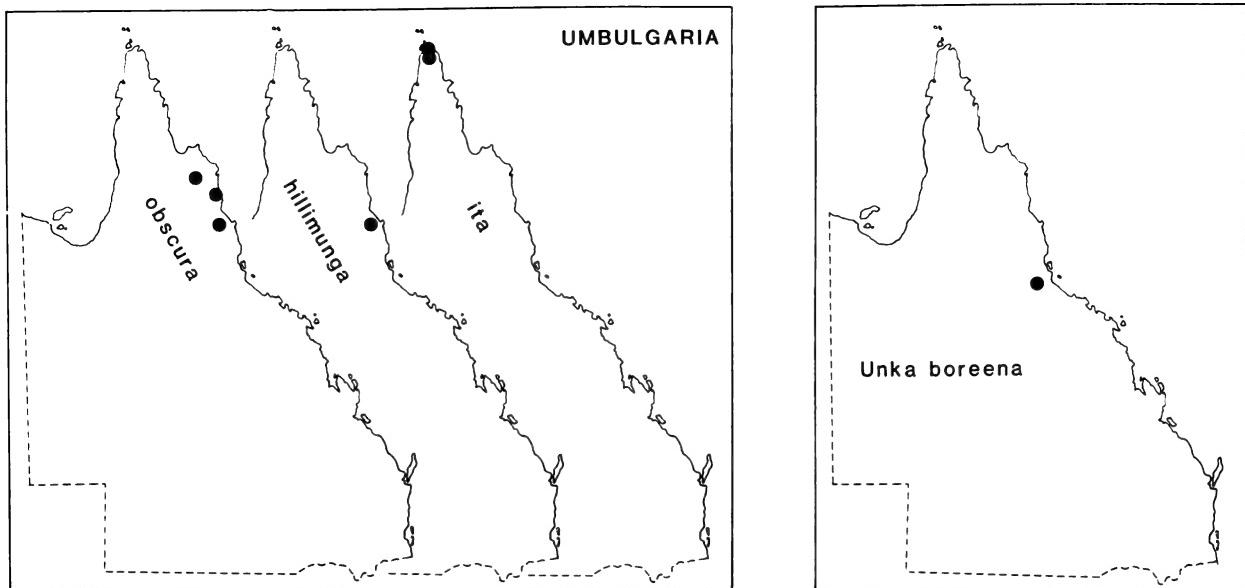


FIG. 280. *Umbulgaria ita*.

4 outer subapical spurs which begin before distal half; spurs longer than tibia is wide. Spines begin in first quarter. Genitalia as in Fig. 282B. Body length 20 mm, with FW's 29 mm; femur III 13.5 mm; tibia III 12.5 mm; cerci 9.0 mm.

Females: A female from Lockerbie, QLD, has a dense covering of longish white hairs especially on lateral lobes, legs I and II, top of femur III, and on tibia III. Tarsi mostly pale. Numerous cells in dor-

FIG. 281. *Umbulgaria* and *Unka* distributions.

sal field of FW's blackened centrally. Ovipositor as in Fig. 282C. Eyes clearly striped—in side view there is a horizontal stripe through top half crossed by 7 or more faint vertical stripes. Body length with wings, 35 mm. Another female from Bamaga, Cape York, has a more mottled appearance on wings with cells behind bases of Cu₁ branches almost completely dark brown to black. Body length with wings 35 mm; ovipositor length, 14 mm.

HOLOTYPE. ♂, Jardine River, Cape York, QLD, 15–17 vi 1969 (G. Monteith) UQC.

HABITAT. Not known.

SPECIMENS. Holotype ♂ UQC. Lockerbie, Cape York, QLD, 3 iv 1964 (Common, Upton) 1♀ ANC. Bamaga, Cape York, QLD, 26 iii 1964 (Common, Upton) 1♀ ANC.

Umbulgaria hillimunga n. sp., Fig. 282D

RANGE. Type locality in northern coastal QLD.

RECOGNITION. Females: Body color mostly dark brown, not mottled and flecked as in *U. ita*. Dorsum of head with 4 pale narrow longitudinal lines on occiput, the two lateral ones beginning at postero-medial surface of eyes, without black spots behind ocelli. Rostrum about as wide as antennal scape. Face pale tan. Eyes (side view) with two horizontal lines in top half. Pronotal disk as in *U. ita* but without prominent black spots. FW's with

irregular, mostly nonparallel main veins; cells brown, some almost hairless centrally, veins nearly black. Cu₁ with 7 or 8 branches; cells behind bases of Cu₁ branches less hairy and slightly darker in color. Femur I unicolorous, pale brown, with silvery-white pubescence. Tibia I triangular in cross section, hairy, with small outer and large inner tympanum. Distal, inner face of femur II dark brown to black. Femur III weakly blotched with lighter and darker brown, and somewhat bumpy on top outer face. Tibia III shallowly grooved between serrations and spurs, and with 4 inner and 4 outer subapical spurs (outer ones longer than inner). Ovipositor as in Fig. 282D. Body length 19 mm, with FW's 27.5 mm; femur III 13 mm; ovipositor 11 mm.

HOLOTYPE. ♀, Kuranda, QLD, 15 iii 1950 (A.M.B.) ANC.

HABITAT. Not known.

SPECIMENS. Holotype ♀ ANC.

Umbulgaria obscura (Chopard), Fig. 282A

Madasumma obscura Chopard 1925: 48. Holotype ♀, Laura, QLD (Mjöberg) SM. Type examined.

RANGE. Forests of northeastern QLD.

RECOGNITION. Males: Body color mottled brown. Dorsum of head pale brown from middle of eyes to near back of head. Back of head with 3 large, some-

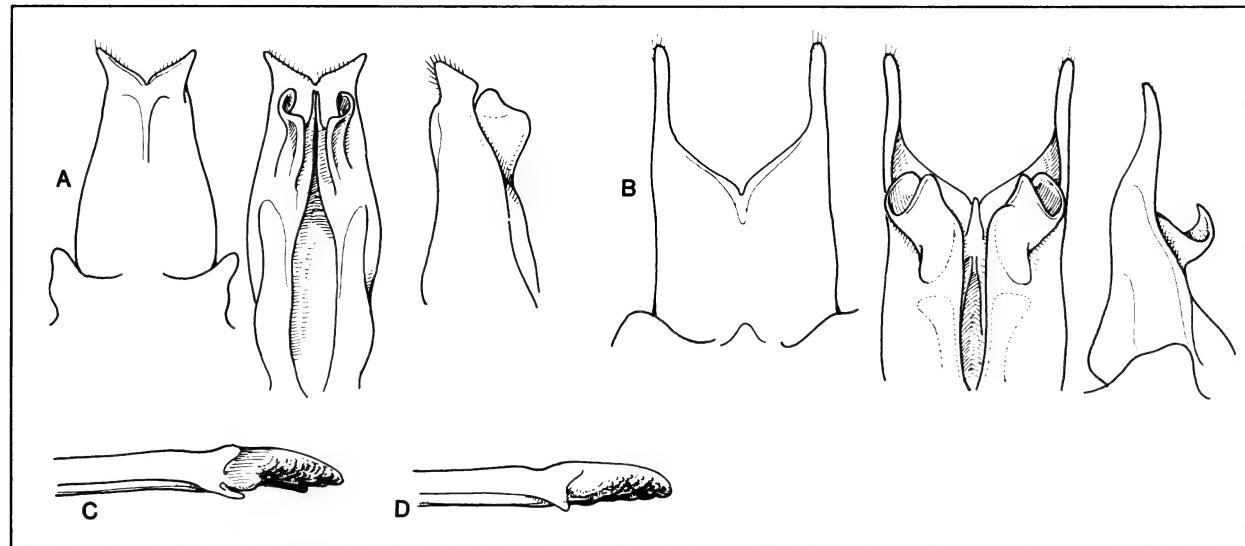


FIG. 282. *Umbulgaria*. A, *obscura* Tolga QLD; B, *ita* Jardine R; C, *ita* ovipositor Lockerbie; D, *hillimunga* ovipositor.

what hidden, black markings, one central and two lateral to it. From middle of eye to front of rostrum mostly dark brown to black. Lightest areas on top of head consist of four pale areas in a line connecting medial sides of eyes. Behind and medial to each lateral ocellus is a black triangular marking which points forward. Median ocellus bordered on front sides by dark pigmentation. Eyes (top view) with two broad dark bands running back to front following lateral curvature. Face mostly pale. Frons with two small dark marks in middle of top third and with two large slightly darker regions directly below antennae reaching to clypeus. Ventral side of scape mostly dark with nearly black distal ring. Top corner of mandible and its articulation black. Pronotum (top view) with convex sides, a very uneven and slightly pitted disk and numerous black spots over entire surface. Front and rear margins of pronotal disk with prominent black setae. Lateral lobes narrow—about $\frac{1}{4}$ the width of disk. FW's veins very irregular, with longitudinal veins joining and separating frequently. Lateral edges of FW's with dark brown streaks running between Sc and R. Legs spotted. Tibia I with a tiny outer and an oval inner tympanum. Tibia III with 4 outer and 5 inner subapical spurs. Genitalia as in Fig. 282A. Body length ca. 17 mm; femur III 12 mm.

Females: See Chopard 1951: 494.

HABITAT. Woodland and forest trees.

SPECIMENS. Holotype ♀ SM. A-59 1♂ ANC. Tolga, QLD, 17 v 1952, 1♂, UQC.

UNKA n. gen.

TYPE SPECIES: *Unka boreena* n. sp.

This genus includes a single species collected in dry woodland west of Mt. Spec, northern QLD (Fig. 283). It differs from other Podoscirtini as follows: FW with stridulum, but without mirror. Tibia I with large inner tympanum but lacking outer one. Cerci strongly modified, perhaps for grasping.

Unka boreena n. sp., Figs. 283, 284

RANGE. Type locality in vicinity of Mt. Spec, QLD.

RECOGNITION. Males: Unlike *Umbulgaria*, male with stridulatory file (118 teeth). Body color yellowish with numerous dark spots on FW's (Fig. 283). Dorsum of head mostly orange back of eyes, with blackish area between eyes, very pale region from middle of eyes to front of ocelli, and brown from median ocellus to front of rostrum. Antennal scape brown. Antennae yellowish, with periodic black rings. Eyes (side view) with one dark and two pale horizontal bands—becoming wider back to front. Face pale, yellowish; side of head more orange.

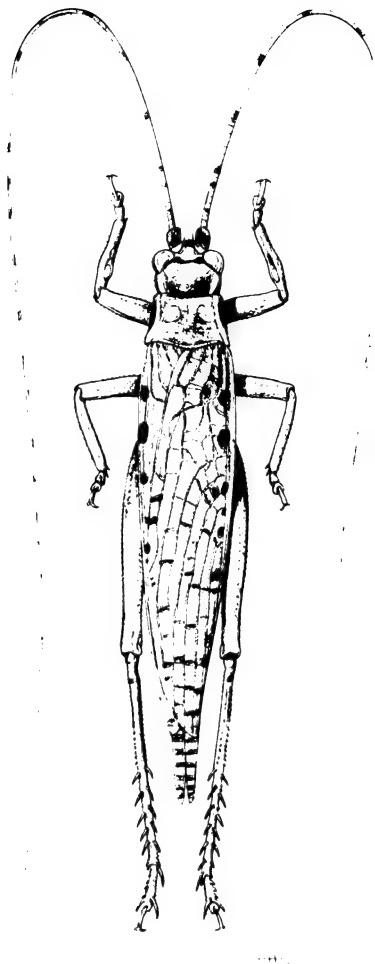


FIG. 283. *Unka boreena* male.

Pronotum orange, lighter at junction of disk and lateral lobes. FW's with numerous dark spots. Legs yellow-orange. Tibia III with 6 inner and 6 outer subapical spurs. Tibia I with large, oval internal tympanum. Genitalia as in Fig. 284. Cerci strongly modified, perhaps for grasping (Fig. 284C). Body length 17 mm, with wings 23 mm; femur III 9 mm; tibia III 8.5 mm.

HOLOTYPE. ♂, Birthday Creek, via Paluma, QLD, 4 i 1973 (B. Cantrell) UQC

HABITAT. Not known.

SPECIMENS. Holotype ♂ UQC.

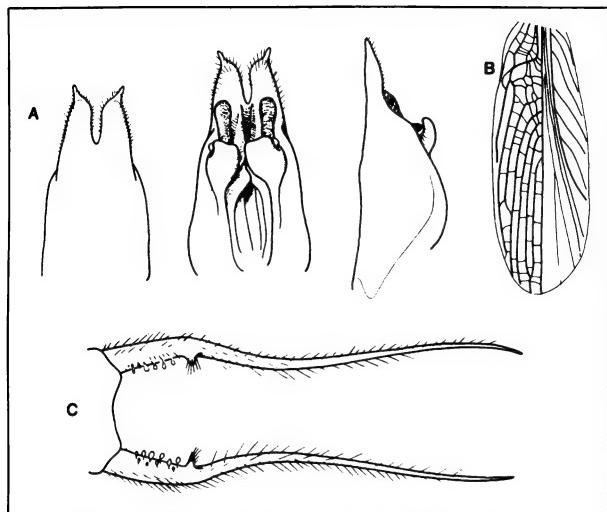


FIG. 284. *Unka boreena*. A, male genitalia; B, male FW; C, male cerci.

EUSCYRTUS GENUS GROUP

In Australia the group is represented by five genera, three of them new. It is distinguished from other members of the Podoscirtini mainly by the continuously tapering ovipositor which has no terminal thickening (Fig. 289P), the serrated claws (Fig. 289O) (secondarily lost in *Turana*), the long narrow rostrum (Fig. 288) and in having at least 6 (usually 7 or more) inner subapical spurs. FW's may be present or absent; when present, stridulum lacking (except one species of *Merrinella*). Auditory tympana present in three of the genera possessing FW's, but absent in at least some species possessing FW's, and all which lack FW's.

The group appears to inhabit mainly tall grasses, and flightless specimens are apparently taken mainly by beating. We found both *Euscyrtus hemelytrus* and *Patiscus australicus* in tall moist grasses.

Genus EUSCYRTUS Guérin

Euscyrtus Guérin 1844. Type species: *Euscyrtus bivittatus* Guérin 1844: 334.

This genus includes 25 species most of which are southeast Asian. Other species are known from Africa and Madagascar, and one species is recorded from Mexico.

RECOGNITION. Fig. 285. The only Australian species may be distinguished from other genera of

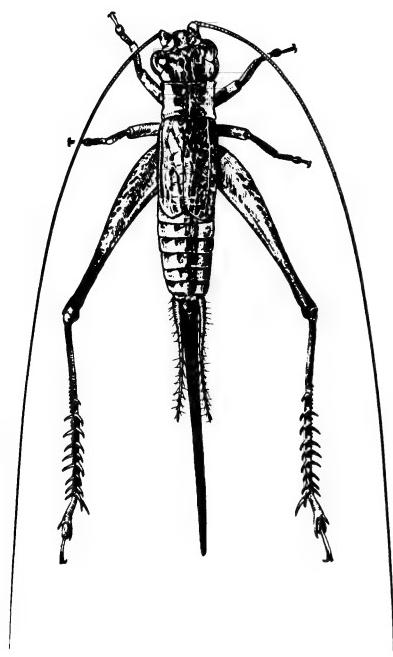


FIG. 285. *Euscyrtus hemelytrus* female (male FW's similar).

the group on the basis of the following characters: Both sexes with FW's (unlike *Turana*). Male FW's without stridulum (unlike the similar appearing *Merrinella tandanya*). Tibia I always with inner tympanum and usually with somewhat smaller outer one; but outer tympanum sometimes obsolete in micropterous specimens. HW's sometimes present—if present they extend beyond end of abdomen. Tibia I longer than pronotum at center. Claws serrated.

Euscyrtus hemelytrus (Haan), Figs. 285, 288A, 289DK

Gryllus (Eneoptera) hemelytrus Haan 1842: 231. Type ♂, Java, L.M. Transferred to *Euscyrtus* by Chopard 1925: 56. Type not seen.

RANGE. Northeastern QLD.

RECOGNITION. Males: Body shape as in Fig. 285. Dorsum of head and pronotum as in Fig. 288A. Side of head and pronotum as in Fig. 288A. FW's without stridulum. FW length variable, from about 1.5 to 3 times as long as pronotum, longest when HW's well-developed. HW's sometimes absent, but when present extending well beyond end of abdomen. Eyes banded (in alcohol bands become inconspicuous). Auditory tympana variable: inner tympanum

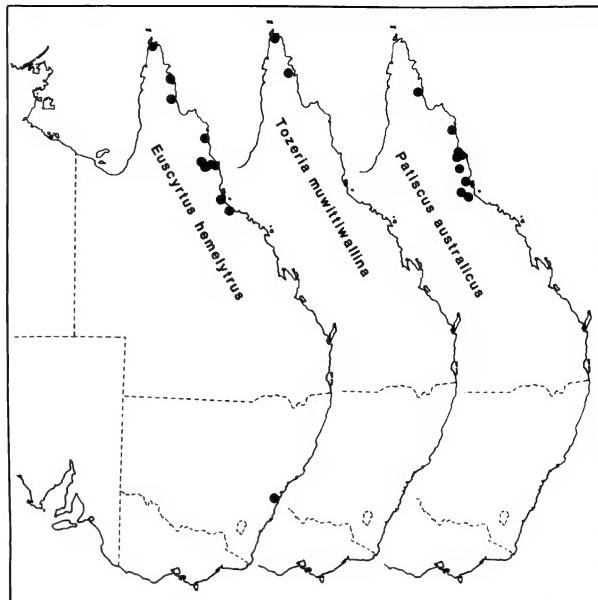


FIG. 286. *Euscyrtus*, *Tozeria*, and *Paticus* distributions.

always present; outer one well-developed (but smaller than inner), very small, or absent. In general, macropterous individuals have larger tympana. Claws serrated. Genitalia as in Fig. 289D. Body length ca. 10.5 mm; femur III ca. 8.5 mm; tibia III ca. 8.3 mm; cerci ca. 3.7 mm.

VARIATION. A female from A-34 has inner and outer tympana barely visible; both represented by depressions, inner slightly larger. Another female from A-34 has distinct inner and outer tympana, inner about as long as tibia is wide, outer about half as large. A female from Lankelly Creek, QLD, also has inner tympanum larger than outer; right outer smaller but more conspicuous than left outer; another female has inner tympanum much more conspicuous than outer. A macropterous male from near Mareeba, QLD, has very large and conspicuous inner and outer tympana. A single macropterous female from near Mareeba, QLD, possesses large inner and outer tympana. A macropterous male and female from Upper Burma have very large inner and outer tympana, but a micropterous female has inner and outer tympana barely visible. A female from Manila, Philippines, has an outer depression and conspicuous inner tympanum.

HABITAT. Tall grasses along permanent streams and rivers.

TABLE 30. Comparison of the genera in the Euscyrtus Genus Group.

Genus	Both sexes with FW's	♂ FW with stridulum	HW's present	Auditory tympana inner/outer ⁵	No. inner/outer subapical spurs	Claws serrated	Tibia I shorter than pronotum at center
<i>Patuscus</i>	yes	no	yes	i/o	12–13/8–9	yes	no
<i>Euscyrtus</i>	yes	no	sometimes	i/o, i/(o), i/–	8–9/6–8	yes	no
<i>Tozeria</i>	yes	no	no	–/–	9–10/6–7	no	yes
<i>Turana</i>	no	—	no	–/–	9–12/6–10	no	yes
<i>Merrinella</i>	yes, ¹ no ²	yes, ³ no ⁴	no	i/o, ³ –/– ⁴	6–8/5–6	yes	no

¹ *M. tandanya*, *M. elinya*.² *M. winnunga*.³ *M. tandanya*.⁴ *M. elinya*, *M. winnunga*.⁵ i/o, inner larger than outer; (o), outer very small or nearly obsolete; –/–, both absent.

SPECIMENS. Holotype ♂ LM. A–16 2♀ ANC. A–19 4♂ ANC. A–23 2♂ 3♀ UM. A–35 1♂ 2♀ ANC. A–37 1♂ ANC. QUEENSLAND: Lockerbie, Cape York, 6–10 vi 1969 (Monteith) 4♂ UQC. Iron Range, 14 vi 1971 (Feehan) 1♂ ANC. Same place, 2–9 vi 1971 (Riek) 1♂ ANC. Lankelly Creek, McIlwraith Range, near Coen, 28–31 x 1969 (Cantrell) 3♀ UQC. Cairns, 23 vii 1945 (Johnston) 1♂ ANC. 2 mi S Mareeba, 5 iii 1969 (Hubbell) 1♂ ANC. Barron Falls, nr Kuranda, 21 xi 1964 (Brooks) 1♀ ANC. NEW SOUTH WALES: Sydney, 20 v 1925 (Froggatt) 1♀ ANC. SOLOMON ISLANDS: Teopasino, Bougainville Isl, 12 vi 1967 1♂ 1♀ ANC.

MERRINELLA n. gen.

TYPE SPECIES: *Merrinella tandanya* n. sp.

The three species in this genus are presently tentatively linked as follows: *M. winnunga* lacks tympana and wings, unlike *M. tandanya*; but these two species have similar color patterns and very similar male genitalia. *M. elinya* is known only from a female; and differs from the type species in lacking tympana and presumably, therefore, a male stridulum; but, like the type species, females possess small FW's, a somewhat thickened ovipositor base, and similar color patterns.

RECOGNITION. Fig. 290. The genus is distinguished from other genera by the following combination of characteristics: Male genitalia with long curved dorsal processes (Fig. 289). Claws serrated (lacking in *Turana*; present in other genera). Color markings as in Fig. 288. Tibia I longer than pronotum at center (unlike *Tozeria* and *Turana*). FW's variable (see diagnosis below). Tympana variable

(see diagnosis below). Tibia III with 6–8 outer and 5–6 inner subapical spurs.

tandanya (VIC and eastern NSW)

1. Both sexes with FW's and males with stridulum.
2. Tibia I with inner and outer tympana.
3. Ovipositor 1.40–1.64 times as long as femur III.

elinya (southeastern QLD)

1. Both sexes with FW's (but males probably without stridulum, because females lack tympana).
2. Tibia I without tympana.
3. Ovipositor 1.6 times as long as femur III.

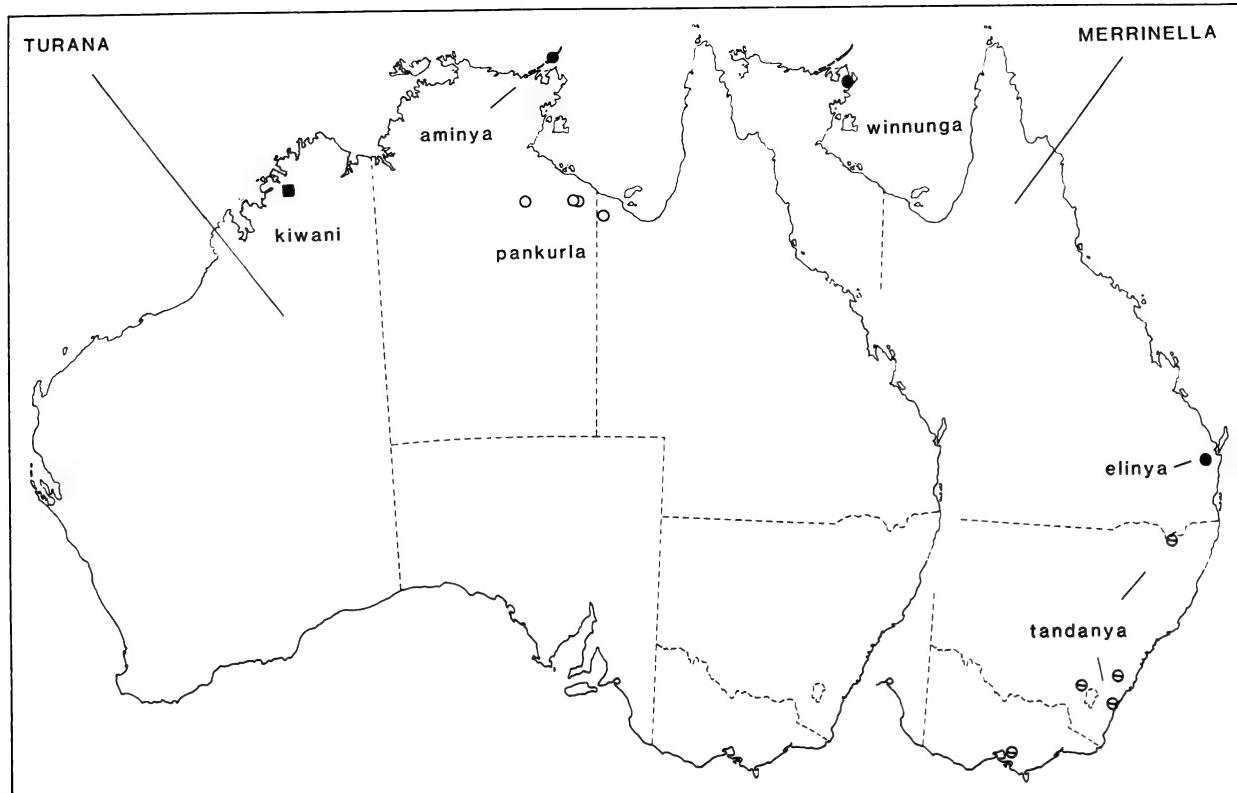
winnunga (Arnhem Land NT)

1. Both sexes without FW's.
2. Tibia I without tympana.
3. Ovipositor 2.78 times as long as femur III.

***Merrinella tandanya* n. sp., Figs. 288D, 289EMN, 290**

RANGE. Mountains of eastern NSW to southern VIC.

RECOGNITION. Males: FW's with stridulum. File of holotype has ca. 210 teeth. Genitalia as in Fig. 289E. FW venation as in Fig. 289N. Dorsum and side of head and pronotum as in Fig. 288D. FW's longer than pronotum but shorter than head plus pronotum. Dorsum of abdomen with two closely spaced median dark stripes (sometimes partly fused) and with broad black bands along the sides. Tympana present on inner and outer faces; inner larger or the two nearly equal in size. Tibia III with 7–8 inner and 6 outer subapical spurs (inc. i-4, o-4). Tibia I length greater than median pronotal length. Claws serrated. Body length to end of abdomen 8–

FIG. 287. *Turana* and *Merrinella* distributions.

12 mm in dried specimens; femur III length ca. 7 mm; cerci ca. 0.3 times as long as femur III.

Females: Very similar to males in color. HW's absent. FW's rounded, slightly overlapping medially and as long as pronotum or slightly longer. Ovipositor 1.41–1.64 times as long as femur III and very thick at base (Fig. 289M). Body length to end of abdomen 9–12 mm (in dried specimens); femur III length 8.5–9.5 mm.

HOLOTYPE. ♂, 2 miles southeast of Berrima, NSW, 29 iii 1964 (Key) ANC.

HABITAT. Probably grasses.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 3♂ 2♀ ANC. NEW SOUTH WALES: 31.51S 150.11E, Broulee, 10 i 1962 (Key) 4♂ 4♀ ANC. Same place, 26 ii 1962 (Upton) 1♀ ANC. Same place, 18 iii 1978 (Rentz) 1♂ ANC. 24 mi S Tenterfield, iii 1964 (Key) 1♀ ANC. 11 mi W Wee Jasper, NSW, 19 ii 1951 (Key, Chinnick) 1♂ 1♀ ANC. VICTORIA: Healesville, 4 v 1956 (Key) 1♂ ANC.

***Merrinella winnunga* n. sp., Figs. 288B, 289F**

RANGE. Type locality in Arnhem Land, NT.

RECOGNITION. Both sexes: Dorsum and sides of

head marked as in Fig. 288B. FW's absent. Tympana absent. Dorsum of abdomen banded like pronotum, with black band on sides of thorax extending onto sides of abdomen. Tibia I longer than median pronotal length. Tibia III with 6–8 inner and 5–6 outer subapical spurs. Ovipositor 2.78 times as long as femur III. Claws serrated. Male genitalia as in Fig. 289F. Male body length 8–10 mm; femur III length 7 mm; cercal length ca. 3 mm. Female body length ca. 10 mm; femur III 8.2 mm; ovipositor ca. 25 mm; cerci ca. 3 mm.

HOLOTYPE. ♂, 12.22S 136.46E, 6 km W by N of Dhupuma Coll., near Nhulunbuy, NT, 19 v 1975 (Key, Balderson, Freeman) ANC.

HABITAT. Probably grasses and shrubs.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♂ 1♀ 1j♀ ANC.

***Merrinella elinya* n. sp., Figs. 288C, 289L**

RANGE. Type locality in Cooloola National Park, QLD.

RECOGNITION. Females: Very similar to *E. tan-*

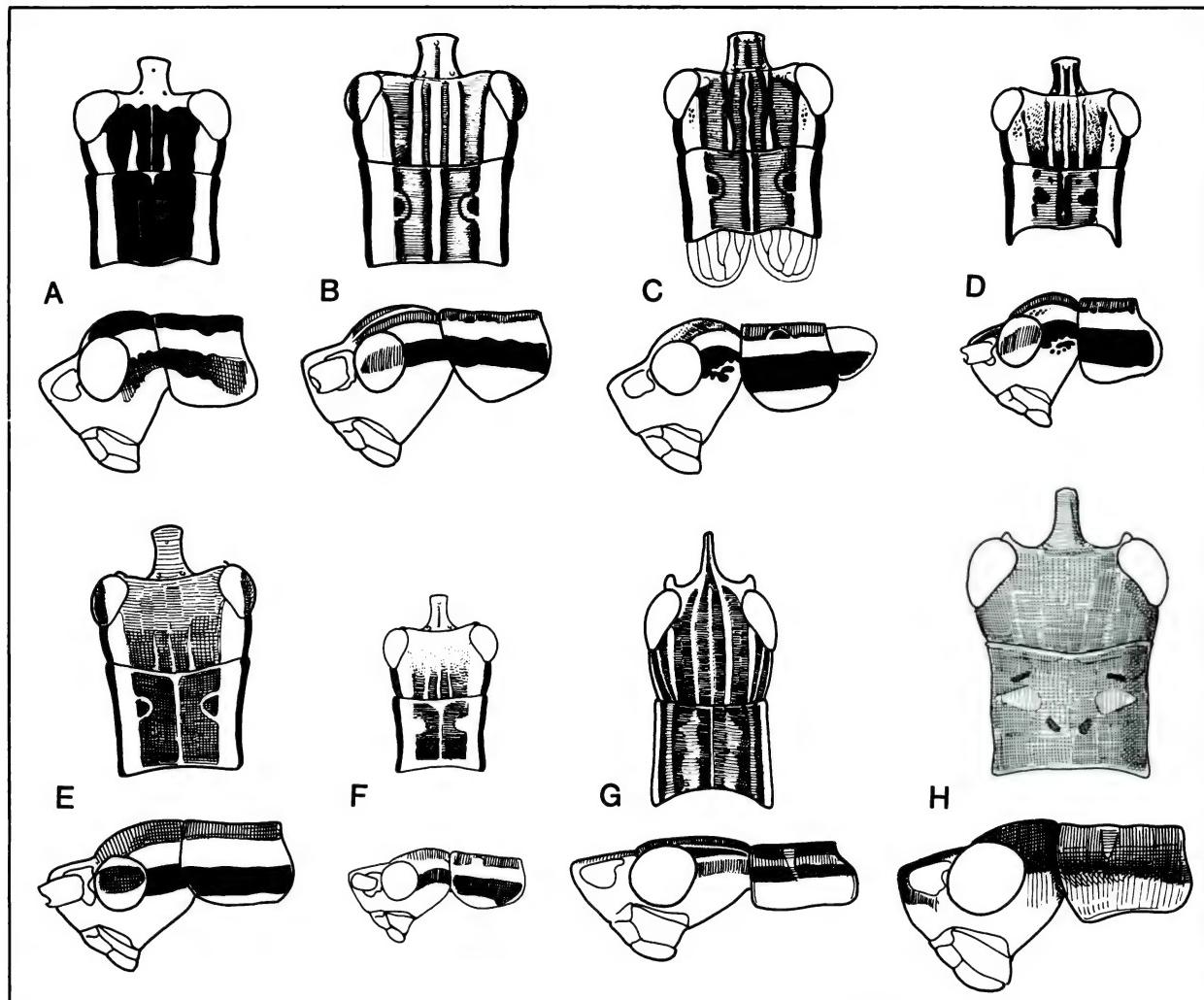


FIG. 288. *Euscyrtus*, *Merrinella*, *Turana*, and *Tozeria*. A, *Euscyrtus hemelytrus* ♀ Lockerbie; B, *Merrinella winnunga* paratype ♀; C, *Merrinella elinya* holotype; D, *Merrinella tandanya* paratype ♂; E, *Turana pankurla* holotype; F, *Turana aminya* holotype; G, *Turana kiwani* holotype; H, *Tozeria* paratype ♀.

danya females, but without auditory tympana, with FW's much shorter than pronotum (Fig. 288C) and with base of ovipositor not as thick (Fig. 289L). Dorsum, sides of head, and pronotum marked as in Fig. 288C. Dorsum of abdomen with broad brown band containing narrow median pale band bordered by black streaks or markings on each segment. Side of abdomen with broad black band. Tibia I longer than pronotum. Tibia III with 7 inner and 6 outer subapical spurs. Ovipositor 1.6 times as long as femur III. Claws serrated. Body length ca. 10 mm;

femur III ca. 8.5 mm; ovipositor ca. 13.5 mm; cerci ca. 3.3 mm.

HOLOTYPE. ♀, Searys Creek, 2 km north of Camp Milo, Cooloola National Park, QLD, 24 x 1978 (Rentz, Balderson) ANC.

HABITAT. Probably grasses.

SPECIMENS. Holotype ♀ ANC.

TURANA n. gen.

TYPE SPECIES: *Turana pankurla* n. sp.

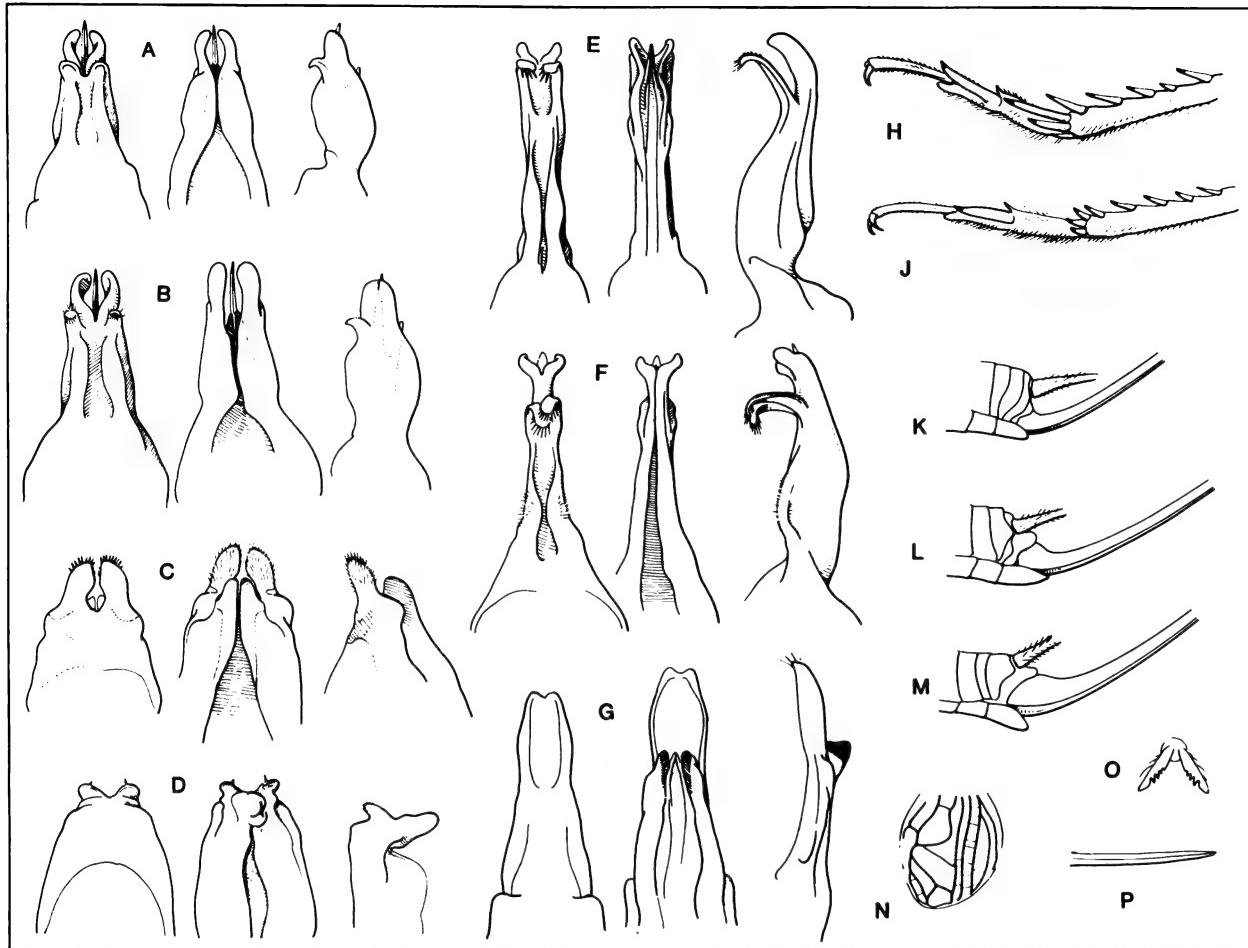


FIG. 289. A–G, male genitalia: A, *Turana aminya* holotype; B, *Turana pankurla* holotype; C, *Tozeria muwittiwallina* holotype; D, *Euscyrtus hemelytrus* Lockerbie; E, *Merrinella tandanya* holotype; F, *Merrinella winnunga* holotype; G, *Patiscus australicus*. H, *Patiscus australicus* tibia III inner; J, same, outer; K, *Euscyrtus hemelytrus*; L, *Merrinella elinya* holotype; M, *Merrinella tandanya* Berrima; N, *Merrinella tandanya* holotype FW. O, serrated claws of *Patiscus australicus*; P, end of ovipositor of *Euscyrtus* Group species.

RECOGNITION. This genus, which includes three species, is related to the genus *Merrinella* from eastern Australia on the basis of male genitalia. It can be distinguished from other genera of Euscirti by the following combination of characteristics: FW's absent in both sexes (similar only to one species of *Merrinella*). Claws not serrated (serrated in all other genera). Auditory tympana absent (similar to *Tozeria* and two species of *Merrinella*). Tibia I shorter than median length of pronotum (shared only with *Tozeria*). Tibia III with 9–12 outer and 6–10 inner subapical spurs.

T. pankurla and *T. aminya* differ from *T. kiwani* in head shape (Fig. 288). They can be distinguished from one another as follows:

pankurla

1. Male genitalia as in Fig. 289B.
2. Male femur III length 8.5 mm.
3. Female femur III length 9–10 mm.
4. Ovipositor 1.16–1.23 times as long as femur III.
5. Dark band on side of body distinct at midpoint of abdomen.

aminya

1. Male genitalia as in Fig. 289A.
2. Male femur III length 7–7.3 mm.
3. Female femur III length 9 mm.

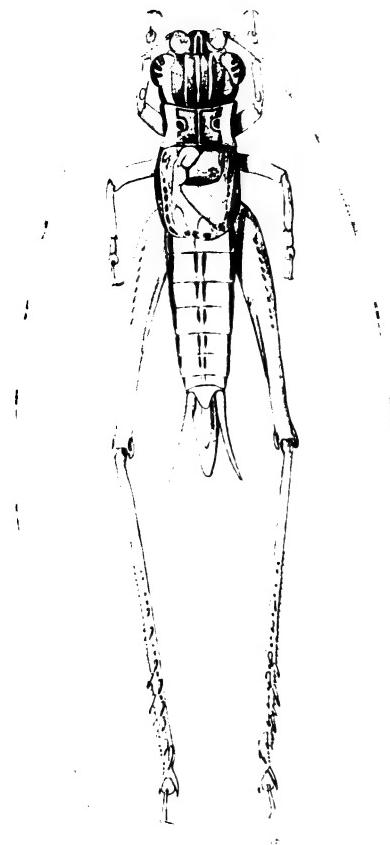


FIG. 290. *Merrinella tandanya* male.

4. Ovipositor 1.08 times as long as femur III.
5. Dark band on side of body absent at midpoint of abdomen.

Turana pankurla n. sp., Figs. 288E, 289B

RANGE. Northwestern QLD and eastern NT.

RECOGNITION. Both sexes lacking FW's. Dorsum of head with broad greyish area containing three narrow pale lines (Fig. 288E). Side and dorsum of head and pronotum marked as in Fig. 288E. Dorsum of abdomen with broad central band; in females this band contains a narrow median pale stripe which runs the length of body; male lacks this median pale stripe. Sides of body with black band on thorax; band variable in intensity, but usually blackish near front of abdomen, fading out posteriorly. In male side of abdomen mostly yellowish. Both inner and outer tympana absent. Tibia I shorter than median pronotal length. Claws not serrated. Tibia III with 10–12 inner and 6–8 outer subapical spurs (inc. i-4 and o-4). Male genitalia as in Fig.

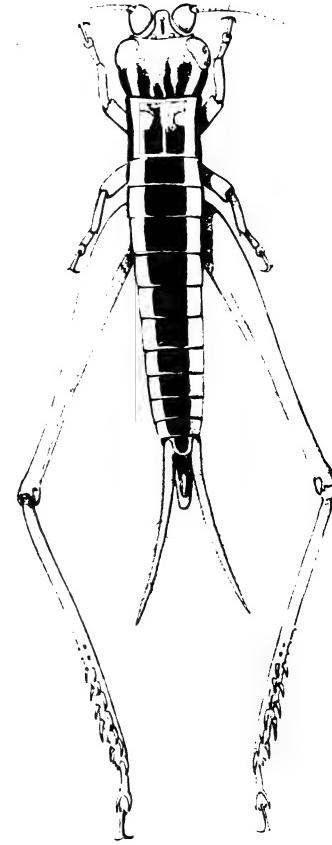


FIG. 291. *Turana aminya*.

289B. Ovipositor 1.16–1.23 times as long as femur III. Male body length to end of abdomen ca. 12 mm; femur III length 8.5 mm; cercal length ca. 5.5 mm. Female body length to end of abdomen 12–14 mm; femur III length 9–10 mm; ovipositor length ca. 11.5 mm; cercal length ca. 5.5 mm.

HOLOTYPE. ♀, 17.24S 138.18E, 9 km SE by E of Westmoreland HS, QLD, 29 v 1975 (Balderson, Freeman) ANC.

HABITAT. Probably grasses.

SPECIMENS. Holotype ♀ ANC. NORTHERN TERRITORY: 16.42S 135.30E, 30 km W by S Cape Crawford, 12 iv 1976 (Key et al.) 1♂ ANC. 16.45S 137.05E, 11 km E by N Robinson River HS, 28 v 1975 (Balderson, Freeman) 1♀ ANC. 16.59S 137.16E, ca. 28 km N by W Calvert Hills HS, 28 v 1975 (Balderson, Freeman) 1♀ ANC.

Turana aminya n. sp., Figs. 288F, 289A

RANGE. Type locality on Rimbija Island, NT.

RECOGNITION. Both sexes: Very similar to *E. pankurla* but both sexes smaller and lack dark band on side of abdomen. Male genitalia also slightly different (Fig. 289A). Dorsum and side of head and pronotum as in Fig. 288F. FW's absent. Tibia I shorter than median pronotal length. Claws not serrated. Tibia III with 9–10 inner and 6–7 outer subapical spurs. Ovipositor 1.08 times as long as femur III. Male body length 9–9.5 mm; femur III length 7–7.3 mm; cercal length 3–4 mm. Female body length 11 mm; femur III ca. 9 mm; ovipositor ca. 10 mm.

HOLOTYPE. ♂, 11.01S 136.45E, Rimbija Island, Wessel Islands, NT, 8 ii 1977 (T. A. Weir) ANC.

HABITAT. Probably grasses.

SPECIMENS. Holotype ♂ ANC. Same data as holotype, 1♂ 1♀ ANC. Same place, 10 i 1977 (Edwards) 1j♀ ANC.

Turana kiwani n. sp., Fig. 288G

RANGE. Type locality in Prince Regent River Reserve, WA.

RECOGNITION. The only specimen, a juvenile female, is tentatively placed in *Turana*, but its very odd head shape suggests that eventually it may be placed elsewhere. Dorsum and side of head as in Fig. 288G. Tergum of abdomen with 6 narrow longitudinal stripes. Tibia I without tympana. Tibia III with 11, 12 inner and 9, 10 outer subapical spurs. Body length 12.5 mm; femur III 8.5 mm.

HOLOTYPE. Juvenile ♀, 15.34S 125.25E, Prince Regent River Reserve, WA, 22 viii 1974 (Bailey, Richards) ANC.

HABITAT. Probably grasses.

SPECIMENS. Holotype ♀ ANC.

TOZERIA n. gen.

TYPE SPECIES: *Tozeria muwitiwallina* n. sp.

RECOGNITION. The genus, presently represented only by the type species, possesses the following diagnostic features: FW's present in both sexes (absent in *Turana*). Males without stridulum (unlike *Merrinella tandanya*). Tibia without tympana (like *Turana* and two species of *Merrinella*, but unlike all other genera). Claws not serrated (unlike all gen-

era except *Turana*). Tibia I shorter than pronotum at center (unlike all genera except *Turana*). Dorsum of body dark reddish-brown.

Tozeria muwitiwallina n. sp., Figs. 288H, 289C, 292

RANGE. Northern Cape York Peninsula.

RECOGNITION. Males: Dorsum of head and pronotum brown, head slightly banded. Eyes brown, speckled with black. Antennae more than 5 times as long as body (tip broken). Face mostly yellowish. Labrum reddish-brown centrally. Frons pointed on top (front view), brown along antennal sockets, and with a horizontal row of 4 small dark spots across bottom third. Eyes (side view) very large, round, taking up most of side of head. Pronotum (top view) with concave sides; front wider than back. Lateral lobes pale in bottom half, dark brown in top half. FW's small, oval, about as long as pronotum, without stridulatory vein. Left and right FW's nonoverlapping. Abdomen reddish brown and spotted on top, black on sides, orange-yellow on bottom. Legs I and II very small, tarsi about as long as tibiae. Tibia I without auditory tympanum. Hind legs very long (Fig. 292). Tibia III with 6 outer and 9 inner subapical spurs. Outer apical spurs short, nearly equal in length. Inner apical spurs about as long as subapical spurs. Tibial spines beginning in 2nd third and continuing between subapical spurs. Cerci brownish, speckled. Body length 13 mm; femur III 10.5 mm; tibia III 10 mm; cerci 5.3 mm; antennae more than 65.0 mm (tip broken).

Females: Very similar to holotype in body shape and coloration. FW's similar to male. Ovipositor slightly longer than body. Ovipositor dorsoventrally flattened, apical thickening taking up about $\frac{1}{5}$ total length of ovipositor. Body length 13.3 mm; femur III 11.0 mm; tibia III 11 mm; cerci 5.5 mm; ovipositor 17.5 mm.

HOLOTYPE. ♂, Mt. Tozer area, Iron Range, QLD, 29 iv to 1 v 1973 (G. B. Monteith) UQC.

HABITAT. Probably stems of shrubs and weeds.

SPECIMENS. Holotype ♂ UQC. Same data as holotype, 1♀ UQC. A-45 3j ANC. Somerset, Cape York, QLD, 16–17 iv 1973 (Monteith) 1♀ UQC.

Genus PATISCUS Stål

Patiscus Stål 1877. Type species: *Euscirtus (Patiscus) dorsalis* Stål 1877: 51.

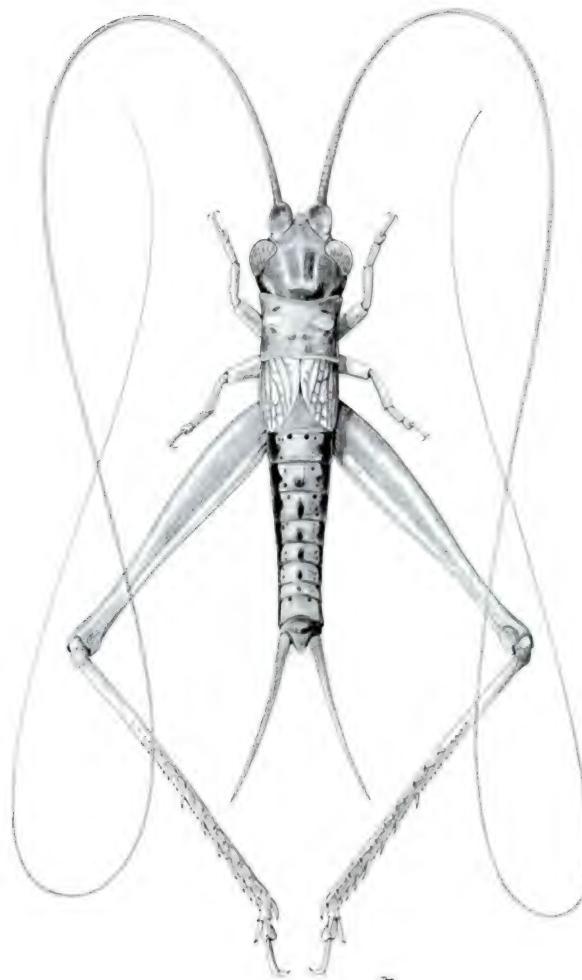


FIG. 292. *Tozeria muwittiwallina*

Chopard (1968: 422) lists nine species in the genus—three from the Philippines and Sumatra, four from India to Malaysia, and two from Africa. He included the only Australian species under *Euscyrtus*.

RECOGNITION. Fig. 293. In Australia *Patiscus* may be distinguished from other genera of Euscirti by the following combination of characters: Head (side view) very flat and with rostrum and occiput on same plane. FW's reaching or almost reaching end of abdomen. Male FW's without stridulum. Head as wide as pronotum. Cerci longer than hind femora. Claws serrated. Tibia I with well-developed inner and outer tympana—inner larger than outer. HW's always present and always extending well

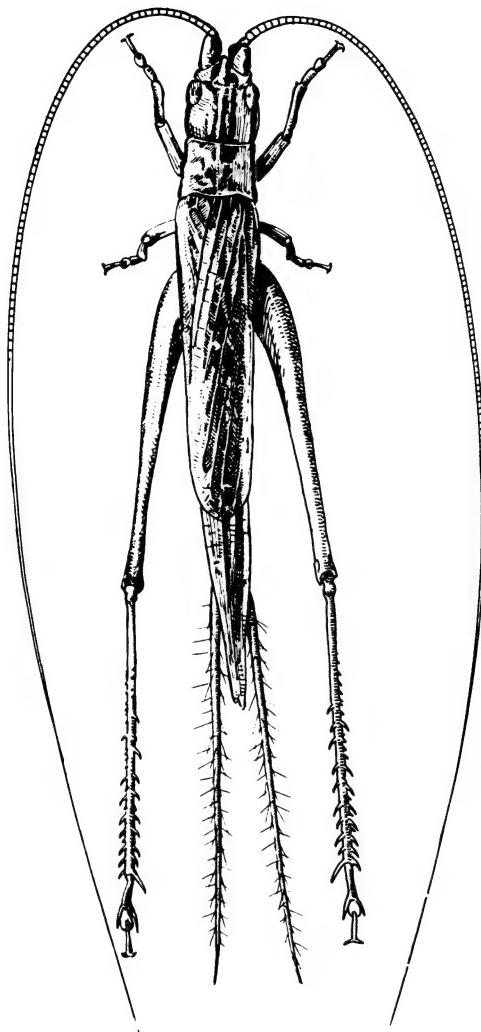


FIG. 293. *Patiscus australicus* (antennae longer than shown).

beyond end of abdomen. Body color pale, straw-colored. R and M veins fused through most of proximal half of FW.

Patiscus australicus (Chopard), Figs. 289GHJ, 293

Euscyrtus australicus Chopard 1925: 56. Holotype ♀, Yarrabah, QLD (Mjöberg) SM. Type examined.

RANGE. Northeastern QLD.

RECOGNITION. Sexes similar. Body color pale and yellowish, with brown stripe along side of body. Body very slender (Fig. 293). Dorsum of head yellowish; inside view very flat. Rostrum about one half as wide as scape. Face pale. Clypeus narrow and with median groove. Side of head mostly pale.

Lateral pronotal lobes with reddish-brown band along upper half; disk yellowish. FW's yellowish on top. R and M veins mostly fused in proximal half. Cu₁ with 2 branches. Lateral field of FW's with light reddish brown band along Sc. FW's reaching second to last tergite. HW's extending well beyond abdomen—roughly to midpoint of cerci. Abdomen yellowish above and below. Cerci pale, broad at base. Legs I and II yellowish. Inner tympanum slightly larger than outer. Femur III pale. Tibia III with 6 outer and 11 inner subapical spurs. No spines between the last 4 outer and last 6 inner spurs. Body length 15 mm; with wings 19 mm; femur III 8.5 mm; tibia III 8.5 mm.

HABITAT. We collected this species by net sweeping through tall grasses in clearing by roadside.

SPECIMENS. Holotype ♀ SM. A-29 3♂ 3♀ ANC. A-37 2♀ UM. QUEENSLAND: Kirrama State Forest, via Cardwell, 16 xii 1966 (Cantrell) 1♂ uqc. Lankelly Creek, McIlwraith Range, near Coen, 28-31 x 1969 (Cantrell) 2♂ uqc. 17.05S 145.33E, Tinaroo Falls Dam, near Yungaburra, 27 v 1976 (Britton) 1♂ 2♀ ANC. Crystal Creek, 4 mi E Paluma, 13 iv 1969 (Common, Upton) 1♂ ANC. Clohesy River, Mareeba Rd, Kuranda, 17 i 1962, 1♀ BM. Barron Falls, near Kuranda, 21 xi 1964 (Brooks) 1♀ ANC. Same place, 2 i 1965 (Brooks) 2♀ ANC. Same place, 12 xii 1964 (Brooks) 1♂ ANC. Big Mitchell Creek, Mareeba-Molloy road, 4 iii 1967 (Colless) 2♀ ANC. 1 mi SE Paluma, 17 i 1970 (Britton, Misko) 1♀ ANC. Tinaroo, NNW Yungaburra, 20-29 ii 1972 (McFarland) 1♂ ANC. Little Crystal Creek, 5 mi W Moongobulla, 14 ix 1956 (White) 1♂ ANC.

TRIBE ITARINI

This tribe is represented in Australia by two species, one belonging to *Tremellia*, the other to *Phaloria*. The tribe, which includes six genera, is most strongly represented in Southeast Asia, but the genus *Phaloria* is also represented in Africa, and the Seychelles.

In Australia the tribe is distinguished from the Eneopterini and Podoscirtini on the basis of the following characteristics: Mirror with two dividing veins (unlike Eneopterini and Podoscirtini). Outer apical spurs unequal in length (unlike Podoscirtini).

Genus TREMELLIA Stål

Tremellia Stål 1877: 47. Type species: *T. spinca* Stål, Philippines, by monotypy.

This genus was referred by Stål, along with *Phaloria* Stål, *Vescelia* Stål, and *Strophia* Stål (the last

two synonymized under *Phaloria* by Chopard 1968: 359), to Saussure's "Amphiacustes." Subsequent authors, however, have placed it under one or another of the three related subfamilies of Itarinae, Podoscirtinae, or Eneopterinae. Chopard (1968) recognizes 4 species, from the Philippines, Java, and Sumba, New Caledonia, and Queensland, respectively.

Chopard's (1959) description is detailed. Of special interest is the internal tibial tympanum only [missing in Chopard's Fig. 14 as apparently in his 1915 illustration of *T. sarasini* (Chopard), but present on the type] and the great distance between the distal nonapical outer spur on tibia III and the nearest apical spur. This character is similar in *Itara* species, thus apparently distinguishing Itarinae from the related subfamilies.

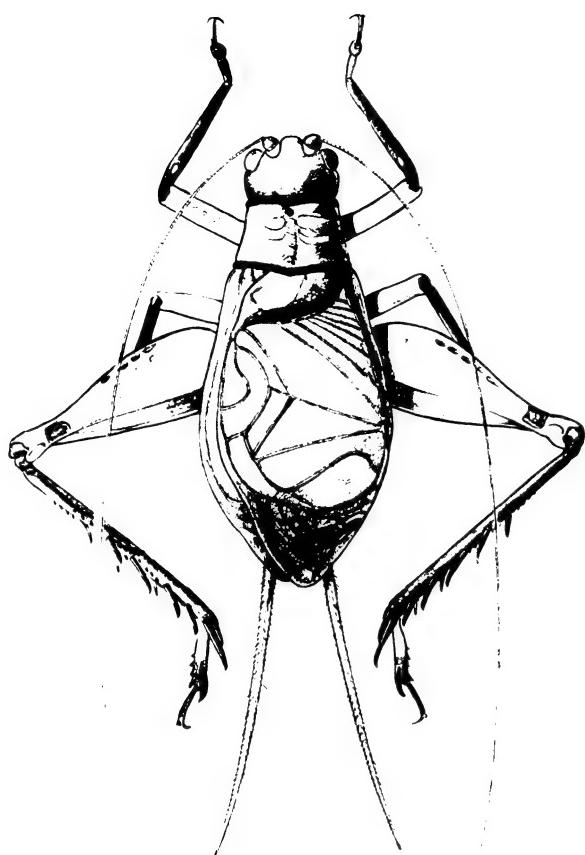
RECOGNITION. See *Phaloria*.

Tremellia australis Chopard, Fig. 297B

Tremellia australis Chopard 1951: 489. Holotype ♂, Cairns District, QLD (A. M. Lea) SAM.

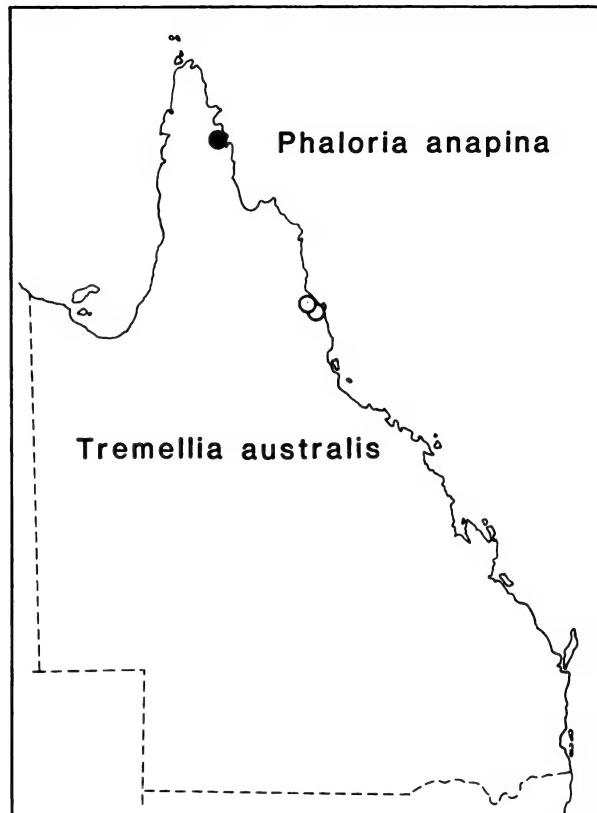
RANGE. Northern QLD forests.

RECOGNITION. Males: Mirror divided by two veins. The following partial description is from Chopard 1951: 489: "Testaceous brown with a few darker spots . . . rostrum wide at base with strongly converging margins . . . rounded at apex. Face . . . yellowish with brown superior part, the two colours separated by a straight line joining the inferior margins of the antennal sockets; the brown part is divided by a fine median yellow band; cheeks with a brown arched band behind the eye. . . . disk of [pronotum] weakly convex, irregular, lateral lobes adorned with two brown bands, the superior one the widest. Abdomen brownish . . . Genitalia short and wide, deeply notched at apex, each lobe ending in a small tooth. Legs long and slender, annulated with brown. Anterior tibiae with internal [tympanum] only; anterior metatarsi long, yellow with brown top, second and third segments blackish, the third very long and slender. Posterior femora feebly dilated at base, with a very long filiform apical part, adorned on external face with an oblique brown band; armed with 2 external and 3 internal short, slender, yellow spines; serrulation reduced to a very few small denticles on the external margin; external apical spurs very short, median

FIG. 294. *Phaloria anapina*.

and particularly supero-internal ones very long; metatarsi very long, compressed; second segment small, depressed, third long and slender. Elytra extending a little beyond the apex of abdomen, a little widening backwards, testaceous brown with a few brown spots; mirror as long as wide . . . divided by two parallel veins . . . 4 oblique veins . . . apical field short with 3 sectors and a very wide reticulation; lateral field dark brown in its superior part; Sc with numerous branches; the space between Sc and R with about 10 parallel small veins. Wings not longer than elytra. Length of body 10.5 mm; pronotum 2 mm; post. fem. 13 mm; elytra 9 mm."

SONG. Fig. 296. Succession of 3-pulse chirps. Heard, never abundantly, in rain forests and trees along streams. A26 and A27 songs may be a new species.

FIG. 295. *Phaloria* and *Tremellia* distributions.

	p/s	p/ch	ch/s	kps	°C
A-26	25	3	0.57	4.6	22
A-27	32	3	—	5.6	22
A-45	40	3	1.2-1.3	5.7	25

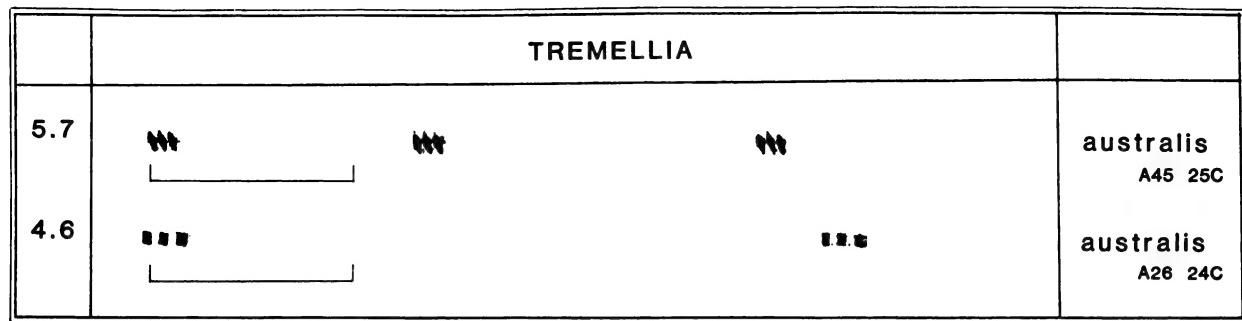
HABITAT. Seen by us only once. Male singing near dusk at Oak Forest Bridge across Barron River west of Kuranda, QLD (A-28) was located on tree trunk 30 feet up and captured by being smashed against bark. Mottled coloration appeared protective.

SPECIMENS. Holotype ♂ SAM. A-28 1♂ (crushed) ANC.

Genus PHALORIA Stål

Phaloria Stål 1877: 49. Type species: *Phaloria amplipennis* Stål, from the Phillipines.

Chopard (1968: 359) lists 34 species in this genus, which ranges from Africa to eastern and southeast-

FIG. 296. *Tremellia* songs. Scale = 0.5 s.

ern Asia and the southwestern Pacific region. The only Australian species fits the generic description of *Heterotrypus* Saussure as given by Chopard in his *Fauna of India* (1969). But this genus is considered a junior synonym of *Phaloria* by Chopard (1968: 359).

RECOGNITION. Fig. 294. The Australian member of the genus possesses the following features which distinguish it from other genera: Tibia I with inner and outer tympana (Australian *Tremellia* have only inner tympanum. Tibia III with 4 inner and 4 outer subapical spurs (*Tremellia* with 3 inner and 2 outer spurs). Mirror with two dividing veins (unlike all other eneopterine genera).

Phaloria anapina n. sp., Figs. 294, 297AC

RANGE. Type locality from Iron Range, Cape York Peninsula.

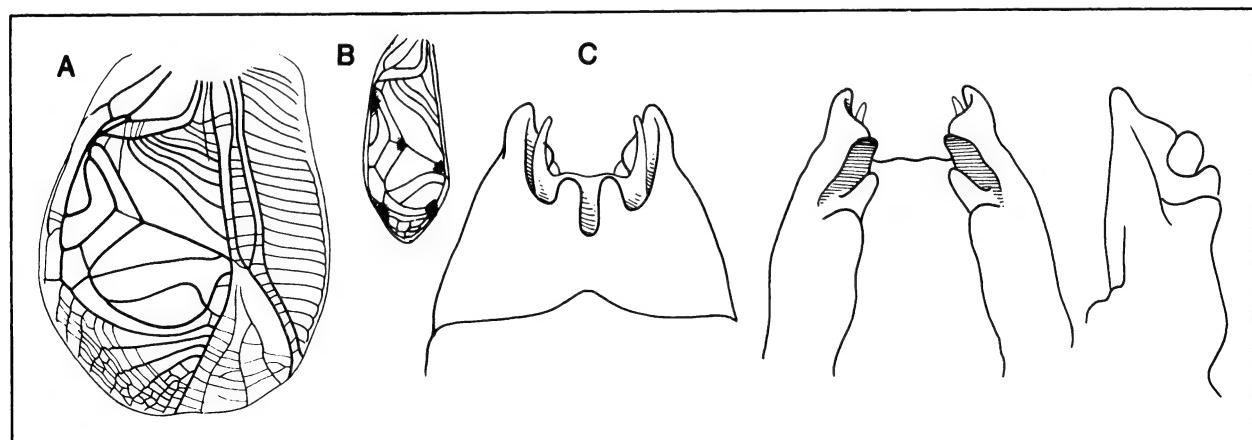
RECOGNITION. Males: Body color almost uniformly orange-brown, but all three tibiae dark brown. Auditory tympana present on inner and outer faces and nearly equal in size. Pronotum deep rusty brown around all margins. File with 23 teeth. Mirror with two dividing veins. Harp with 9 veins. Sc with 20 visible branches. Tibia III dark brown including all spurs; with 4 inner and 4 outer subapical spurs. Spur i-3 very long—about as long as basal tarsal segment. Genitalia as in Fig. 297C. Body length to end of FW 17 mm; FW length 12 mm; femur III length 11.5 mm; cercal length 12 mm.

HOLOTYPE. ♂, Iron Range, Cape York, QLD, 27 iv to 4 v 1973 (Monteith) UQC.

SONG. Not known.

HABITAT. Probably rain forest.

SPECIMENS. Holotype ♂ UQC.

FIG. 297. A, *Phaloria anapina* holotype; B, *Tremellia australis* FW; C, *Phaloria anapina* male genitalia.

SUBFAMILY OECANTHINAE

Chopard (1951, 1968) treats this group as a separate family because its members "differ in so many features" from the other Gryllidae. In this work we leave the group at the subfamily level because we do not agree that the group is any more distinctive than the Mogoplistinae or Myrmecophilinae, groups which are treated as subfamilies. Nomenclature cannot adequately reflect the degree of differentiation in the various groups, hence we have adopted a traditional classification which works and is simple to remember. Presently the subfamily includes the following genera: *Oecanthus* Serville, *Xabea* F. Walker, *Neoxabea* Kirby, *Prognathogryllus*, *Leptogryllus*, and *Thaumatogryllus*. The last 3 genera are members of the tribe Prognathogryllini which is endemic to Hawaii. Chopard (1968) placed the tribe in the subfamily Eneopterinae. We have examined *Prognathogryllus* carefully and on the basis of the cleft tarsal claw, the prognathous condition of the face, wing venation, and condition of cerci (tip of cerci with a small spine) we conclude that the genus is related to *Xabea*. *Leptogryllus* and *Thaumatogryllus* are probably wingless derivatives of *Prognathogryllus*.

RECOGNITION. Both sexes strongly prognathous. Tarsal claws cleft or bilobate (Fig. 301GH). Male FW with very large mirror which is about half as long as entire forewing and has two dividing veins. Harp with 2–5 veins. Tibia I with large inner and outer auditory tympana. Pronotum much longer than wide. Body shape very slender and delicate. Femur III hardly thickened. Tibia III either with spurs and small spines, with spines only, or without spurs or spines. Singing males usually possess a spermatophore.

The Oecanthinae are all vegetation-inhabiting, living on grasses, herbs, shrubs, or trees.

Oecanthus

1. Cerci longer than tibia II.
2. Tibia III with subapical spurs and small spines.
3. Male FW with straight Cu₁ vein.

Xabea

1. Cerci shorter than tibia II.
2. Tibia III without subapical spurs or small spines.
3. Male FW with bent Cu₁ vein.

Genus **OECANTHUS** Serville

Oecanthus Serville 1831: 134. Type species: *Acheta italicus* Fabricius 1781: 355 (=*Gryllus pellucens* Scopoli 1763: 109), Europe, selected by Rehn 1904: 547.

This genus contains 47 described species (Walker 1966; Chopard 1968), distributed over nearly the whole region of the world occupied by crickets.

The three Australian members of this genus live on grasses and low herbage. As with several species groups in North America, they are relatively easy to capture at night by tracing the males' songs. Oecanthine songs are clear, loud, low-pitched trills. In windy areas these songs can generally be recognized because the size and position of the males' FW's and the exposed singing perches cause "catches" in the song as gusts of wind move the FW's. A peculiarity of the Australian species is the tendency of individuals to sing either short, evenly spaced trills or to trill more or less continuously. This behavior is discussed in detail in the species accounts.

RECOGNITION. *Oecanthus* differs from *Xabea* as follows: Cerci straight and as long or longer than tibia II. Hind tibiae with 2–5 inner and outer subapical spurs (spurs completely lacking in *Xabea*) and with small immovable spines above and between spurs. Cu₁ vein straight, not bent as in Fig. 308A.

rufescens (widespread)

1. Abdomen usually with narrow, dark brown mid-dorsal stripe.
2. FW's usually marked with brown or reddish pigmentation at edges of dorsal field.
3. Tibia III with 3–5 outer and 4–5 inner subapical spurs.

angustus (widespread)

1. Abdomen entirely pale dorsally.
2. FW's without brown or reddish coloration at lateral edges.
3. Tibia III with 3–5 (usually 3) and 4–5 inner (usually 4) subapical spurs.

adyeri (Kimberley district, WA)

1. Abdomen entirely pale dorsally.
2. FW's without lateral reddish or brownish coloration.
3. Tibia III with 2–3 (usually 2) outer and 3–4 (usually 3) inner subapical spurs.

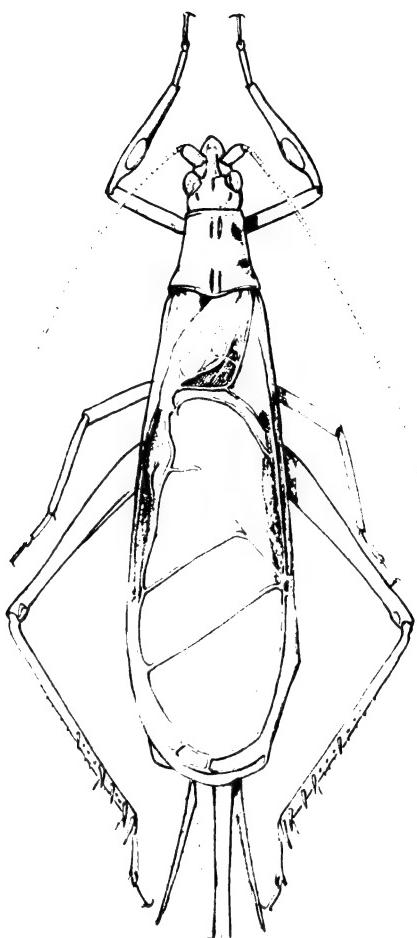


FIG. 298. *Oecanthus rufescens*.

***Oecanthus rufescens* Serville, Figs. 298, 301ADG**

Oecanthus rufescens Serville 1839: 361. Lectotype ♀, Bombay, India, PM. Type examined.

Oecanthus gracilis Haan 1842: 236. Type lost: Java and Mandawey, Borneo.

It is unlikely that an Australian tree cricket is conspecific with an Indian species; however, until more direct comparisons can be made between Indian and Australian specimens, we retain the name *rufescens* for this species.

The type is in poor condition, lacking forelegs, most antennal segments, cerci, half of subgenital plate, left leg III, and with body partly eaten by

dermestids. It is macropterous and a uniform brownish color. Body length now under 17 mm, but was probably 18 mm; pronotal length 2.6 mm, anterior width 1.7 mm, posterior width 2.1 mm; tegminal width, 3 mm.

RANGE. Widespread in eastern QLD and northern NT and WA.

RECOGNITION. Tibia III with 4–5 (rarely 3) outer and 4–5 inner subapical spurs. General coloration with brownish tinge. FW's in both sexes usually brown at lateral edges of dorsal field; males especially brown in chordal area and along top of lateral field. File with 45–57 teeth (n=39). Abdomen usually with narrow dark brown mid-dorsal stripe, especially in males. Abdominal tergites and sternites usually marked laterally with brown, especially in females and especially toward tip of abdomen. Male genitalia as in Fig. 301A.

SONG. Fig. 300. Irregularly broken trill. Apparently in very dry or cool weather short trills, 1–3 seconds long, may be produced singly or very far apart, such as 3–4 trills per 10 seconds.

		p/s	kps	°C
A-2	n=3	25.0–25.4	2.2–2.4	16
A-3		29.5	2.4	18
A-4		39.0–41.0	2.9–3.3	22
A-4	n=3	29.5–35.0	2.6–2.8	18
A-18		34.0	2.9	18
A-26		32.5–35.0	2.8	22
A-33	n=3	37.0–37.9	3.0–3.1	22
A-68		54	3.8	27
A-166		52	3.8	29
A-268		38	3.3	20
A-269	n=2	35, 36	2.7, 3.3	21
A-270		33.6	2.6	ca. 21
A-272	n=3	32.0–33.4	2.5–3.2	21
A-298		44.0	3.0	18.3
A-479	n=2	42.6, 43.5	3.2, 3.4	23
A-478		49.5	3.8	25
A-496		50.6	3.6	26
A-514		48.0	3.5	24
A-540	n=2	37.0, 42.0	2.8, 3.1	18–21
A-780	n=2	34.0	2.8	23

HABITAT. Commonly found 2–4 feet above ground in dry reddish-brown grasses where its coloration has a concealing effect. Probably breeds continuously in north, with retardations during dry and cool periods, and overwinters in egg stage in south.

SPECIMENS. Lectotype ♀ PM. A-2 1♂ ANC. A-6 6♂ 2♀ ANC, 2♂ 2♀ UM. A-7 2♂ ANC. A-22 1♀ ANC. A-26 1♀ ANC, 2♂ 1♀ UM. A-33 1♂ ANC. A-35 1♂. UM. A-46 2♂ ANC. A-51 1♀ ANC. A-55 1♂ ANSP. A-130 1♂ 1♀ ANC. A-166 1♂ 1♀ ANC. A-269 1♂ ANC. A-272 1♂ ANC. A-303 1♂ ANC. A-477 1♂ ANC. A-480 1♂ ANC. A-492 1♂ ANC. A-514 1♂ ANC. A-538 2♂ UM. A-590 1♂ ANC. QUEENSLAND: Bundaberg, 23–30 vi 1971 (Frauca) 4♂ ANC. Brisbane, 9 ii 1941 (Ashby) 1♂ ANC. Miami, 1 vi 1961 (Key) 1♀ ANC. Coast Range, 12.5 km S Biggenden, 4 vi 1978 (Frauca) 1♀ ANC 17 mi WNW Arcadia HS, NNE of Injune, 28 iv 1957 (Key, Chinnick) 1♀ ANC. 60 mi S Ayr, 12 ix 1950 (Riek) 1♀ ANC. 23 mi SE Rolleston, 29 xii 1955 (White) 1♀ ANC. Paluma, 5 x 1965 (Mesa, Sanduski) 1♀ ANC. 25.03S 152.19E, 11 km N by E Cordalba, 9 ix 1977 (Upton, Frauca) 1♀ ANC.

Oecanthus angustus Chopard, Fig. 301BEHJ

Oecanthus angustus Chopard 1925; 32. Holotype ♀, Kimberley district, WA (Mjöberg) SM. Type examined.

The type is a uniform yellowish color with tip of ovipositor dark brown. Length of body about 11.1 mm; length of left tegmen, 11.9 mm, right hind wing, 16.9 mm; right femur III, 7.8 mm; width of right tegmen, 1.7 mm; posterior width of pronotum, 1.76 mm; anterior width of pronotum 1.5 mm; length of pronotum, 2.0 mm; width of head 15.7 mm; ovipositor length, 4.81 mm.

This type is considered distinct from that of *rufescens*, and assigned to the species whose song is here described, on the basis of color, size, tegminal width, and general appearance.

RANGE. Widespread through Australia.

RECOGNITION. Tibiae with 3–5 outer (usually 3) and 4–5 inner (usually 4) subapical spurs. General color pale yellow-white or pale straw-colored. File with 61–76 teeth. Dark markings described for *O. rufescens* usually absent, or never all present together. Male genitalia as in Fig. 301B.

SONG. Fig. 300. Varies peculiarly between a more or less unbroken trill and chirping song (or burst-trilling) with 6–7 pulse chirps. Often, in a single locality one hears only the chirping song or only the trilling song. Sometimes there is a strong preponderance of one kind of song. Rarely the two songs are produced in about equal proportions. Individuals can be heard changing back and forth between the two song types. This variation does not seem to be associated with the presence of other individuals or the closeness of other singing males. An individual that changes from one song to another usually begins with the chirping version. Relatively few individuals in any colony of *O. angustus* have

been heard changing songs, and this, together with the other observations given above, gives the impression of genetic variation. For this reason, we kept separate records of the two song types in compiling distributional information.

		p/s	p/ch	ch/s	kps	°C
A-4	n=2	32.3	8-26	2.7	3.5	22
A-68		40.0	6	4.5	4.0	28
A-71	n=3	37.8–40.0	7-8	3.75	3.8–4.4	28
A-71		41.4	— trill —	—	4.5	28
A-88	n=3	30.0–32.0	7-14	2.3–2.6	3.1–3.5	23
A-88	n=3	27.8–30.0	— trill —	—	3.1–3.2	23
A-91	n=4	23.2–27.3	7-12	1.7–2.3	2.8–2.9	18
A-104		33.3	8-9	2.7	3.6	23
A-116		47.2	— trill —	—	3.6	24
A-175		46.8	8-10 (0.23–0.27)	—	4.2	26
A-181		40.0	—	4.1	5.2	28
A-236		42.0	7-8 (0.22–0.24)	—	4.0	28
A-282		38.5	7-8 (0.26–0.3)	—	3.8–3.9	26
A-317		32.0	9-12	—	3.6	25
A-333	n=2	40.0	5-9	3.4	3.8, 3.9	25
A-395		40.0	7	3.4	4.0	26
A-404		42.8	7	3.9	4.2	29
A-408		47.6	5-6	5.2	—	31
A-434		36.0	— trill —	—	3.8	23
A-434		38.0	9	5.8	3.8	23
A-440		43.8	7-9+ trill 4.3	—	4.3	29
A-478	n=3	40.5–42.6	— trill —	—	4.0–4.1	25
A-617		40.9	10	3.5	4.2	27
A-618		38.0	— trill —	—	4.1	27
A-618		41.0	7-9	3.8	4.2	27
A-751		39.6	— trill —	—	4.0	24
A-767		38.0	7-9 (0.29–0.30)	—	3.9	23
A-780	n=3	32.5–33.2	6-8 (0.32–0.42)	—	3.4–3.5	23
A-808		36.6	— trill —	—	3.9	23
A-816		36.0	— trill —	—	3.5	23

HABITAT. Most often found in grasses 1–3 feet above ground, but unlike *O. rufescens*, sings rarely from trees 10 or 15 feet above ground. Such individuals are probably migrants that have more or less accidentally landed in a tree and are singing there only briefly.

SPECIMENS. Holotype ♀ SM. A-3 2♂ 1♀ ANC. A-4 1♂ UM. A-10 1♂ ANC. A-68 2♂ ANC. A-71 3♂ 1♀ UM. A-80 1♂ ANSP. A-88 6♂ ANC. A-159 1♂ ANC. A-164 1♂ ANC. A-174 1♂ ANC. A-179 1♂ ANC. A-181 1♂ ANC. A-182 1♂ 1♀ ANC. A-189 4♂ ANC. A-317 1♂ ANC. A-333 1♂ ANC. A-362 3♂ ANC. A-366 1♂ ANC. A-395 1♂ ANC. A-407 1♂ ANC. A-434 2♂ ANC. A-440 1♂ ANC. A-440 1♂ ANC. A-457 2♂ ANC. A-478 4♂ ANC. A-618 3♂ ANC. A-719 1♂ ANC. A-807 7♂ 1♀ ANC. A-736 1♂ ANC. A-751 1♂ ANC. A-767 1♂ ANC. A-780 1♂ ANC. A-785 1♂ ANC. WESTERN AUSTRALIA: 18.25S 123.05E, Logues Springs, 102 km

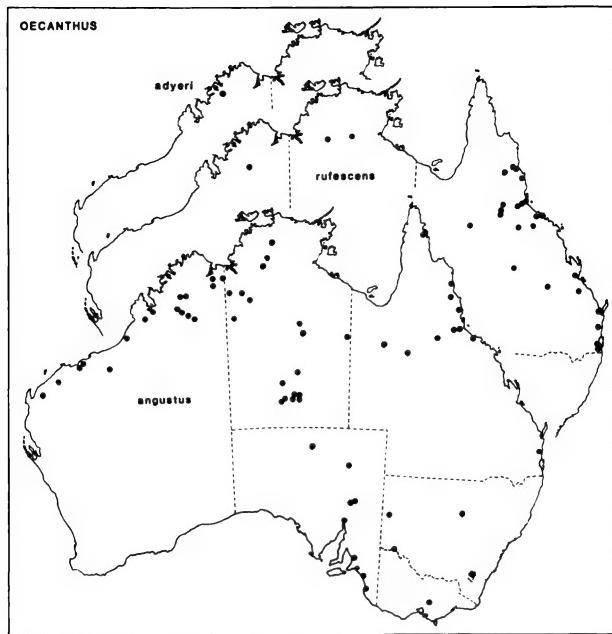


FIG. 299. *Oecanthus* distributions.

SE by E Broome, 18 viii 1976 (I. F. B. Common) 1♂ ANC. 21.46S 116.14E, 8 km SE of Deepdale HS 27 iv 1971 (Key, Upton, Mitchell) 1♂ ANC. Bev. Springs Station, 11 viii 1974 (Bailey, Richards) 1♂ ANC. 32.11S 125.42E, 13 mi NE by E of Caiguna, 14 x 1968 (Balderson, Upton) 1♀ ANC. Cocoa Beach, Trimouille Id, Monte Bello Islands, 10–11 xi 1953 (Campbell) 1♂ 1♀ ANC. Location unknown, 3 viii 1978, 1♂ ANC. NORTHERN TERRITORY: 2 mi W of Kunoth Bore, NW of Alice Springs, 12 x 1969 (White, Marginson) 1♂ 1♀ ANC. 16.32S 136.10E, Cattle Ck, 54 km S by W of Borroloola, 27 x 1975 (Upton) 1♂ ANC. 19.24S 135.58E, 15 km SW of Alroy Downs HS, 10 iv 1976 (Key, Balderson et al.) 1♀ ANC. 25.23S 135.26E, Old Andado, E by N of Andado HS, 27 ix 1972 (Key et al.) 2♂ 1♀ ANC. 25.18S 135.25E, 18 km NE of Andado HS, 29 ix 1972 (Key et al.) 2♂ ANC. 19.05S 130.00E, 30 mi SW of Mt. Winnecke, 7 vii 1969 (Simpson) 1♂ ANC. 10 mi N of Daly Waters, 16 viii 1960 (White) 1♀ ANC. 16.24S 131.02E, 2 mi ENE of Victoria R. Downs HS, 10 vii 1969 (Mendum) 1♀ ANC. 15.58S 136.21E, 12 km NNE of Borroloola, 1 xi 1975 (Upton) 1♂ ANC. 23.41S 134.15E, 39 km E of Alice Springs, 25–26 ix 1968 (Rentz) 4♂ ANC. 25.50S 133.36E, 31 km E of Kulgera, 1 x 1972 (Key et al.) 1♂ ANC. Nr. Yuendumu, WNW of Alice Springs, 19–22 vi 1973 (Meyer-Rochow) 1♀ ANC. 23.02S 133.03E, 1 mi N of Mitchell Bore, 5 xii 1968 (Nicholls) 1♂ ANC. 14.48S 131.03E, 28 mi SW of Dorisvale HS, 22 ix 1968 (Mendum) 1♀ ANC. 24.15S 133.26E, James Ranges, 22 ix 1978 (Rentz) 1♂ ANC. 23.36S 133.34E, New Well Camp, 33 km WNW of Alice Springs, 30 ix 1978 (Rentz) 1♂ ANC. 23.41S 134.15E, 39 km E of Alice Springs, 25–26 ix 1978 (Rentz) 3♀ ANC. 24.11S 134.01E, Ooraminna Camp, 56 km S by E of Alice Springs, 23 ix 1978 (Rentz) 1♂ ANC. 17.29S 133.30E, 8 km NW by N of Elliot, 14 x 1972 (Upton) 1♀ ANC. 25.46S 133.17E, 8 km N of

Kulgera, 21 ix 1978 (Rentz) 2♂ ANC. 23.46S 133.46E, Roe Ck, 12 km SW by W of Alice Springs, 27 ix 1978 (Rentz) 4♂ 1♀ ANC. 23.38S 133.53E, Junction Waterhole, Todd R, 9 km N by E of Alice Springs, 28 ix 1978 (Rentz) 2♂ ANC. SOUTH AUSTRALIA: 28.39S 138.41E, Coopers Bore, NE by N of Etadunna HS, 20 ix 1972 (Key et al.) 1♂ ANC. 27.03S 134.22E, 45 km NE of Welbourn Hill, 20 ix 1978 (Rentz) 5♂ ANC. 26.57S 133.34E, Indulkana Ck, E by S of Granite Downs HS, 21 ix 1978 (Rentz) 1♂ ANC. 28.20S 135.50E, Edwards Creek, 19 ix 1978 (Rentz) 6♂ 1♀ ANC. 27.42S 138.16E, The Warburton (R.), 2 km NE of Kalamurina HS, 17 ix 1972 (Key et al.) 4♂ 2♀ ANC. Leigh Ck, 29 ix 1965 (Gregory) 1♀ ANC. 3 mi WNW of Alberrie Creek Rly. Sta, 8 x 1969 (White, Marginson) 1♂ ANC. QUEENSLAND: 26.38S 144.00E, 27 km W of Quilpie, 7 v 1975 (Balderson, Freeman) 1♀ ANC. 29 km N of Roma, 9 xi 1974 (White) 1♂ ANC. Moa Island, Torres Strait (Schomberg) 1♂ SAM. 3 km NW of Mt Mowbullan, Bunya Mtns, 1020 m, 6 & 8 i 1970 (Britton, Holloway, Misko) 2♀ ANC. 27 km S by E of Cunnamulla, 24 iii 1972 (R. C. Lewis) 1♂ ANC. 30 km ENE of Injune, 9 xi 1974 (White) 1♂ 2♀ ANC. 27.35S 145.51E, 4 km S of Androssan HS, nr Wyandra, 28 ix 1977 (Rentz, White) 7♂ 1♀ ANC. 20.44S 145.11E, Burra, 2 x 1977 (Rentz, White) 6♂ ANC. 5 mi SSW of Charleville, 28 viii 1960 (White) 1♀ ANC. 2 mi SE of Mary Kathleen, 21 iv 1962 (Key, Corby) 1♀ ANC. 20.44S 140.3E, 6 km SW by E of Cloncurry, 4 x 1977 (Rentz, White) 1♀ ANC. 20.47S 140.40E, 18 km ESE of Cloncurry, 3 x 1977 (Rentz, White) 1♂ ANC. 22.12S 145.04E, 7 km N by E of Rangelands, 1 x 1977 (Rentz, White) 3♂ 2♀ ANC. 60 km N by W of Muttaburra, 23 viii 1977 (Upton) 1♂ ANC. 24.18S 146.23E, 9 km SW by W of Cheshire HS, nr Tambo, 29 ix 1977 (Rentz, White) 1♂ 1♀ ANC. 9 mi SSE of Taroom, 23 iii 1962 (Chinnick, Corby) 1♀ ANC. 9 mi WNW of Durham Downs HS, 18 iii 1964 (Chinnick) 1♀ ANC. Shute Harb., 3 iii 1964 (Common, Upton) 1♀ ANC. NEW SOUTH WALES: 2 mi SE of Coonabarabran, 16 x 1954 (White, Brock) 1 ANC. Wittabrenna Ck, 20 km N of Tibooburra, 25 iii 1972 (Lewis) 1♂ ANC. ACT: Canberra, 26 ix 1971 (Key) 1♂ ANC. LOCALITY UNKNOWN: 33 W Kihee, 12 x 1949 (E. F. Riek) 1♀ ANC.

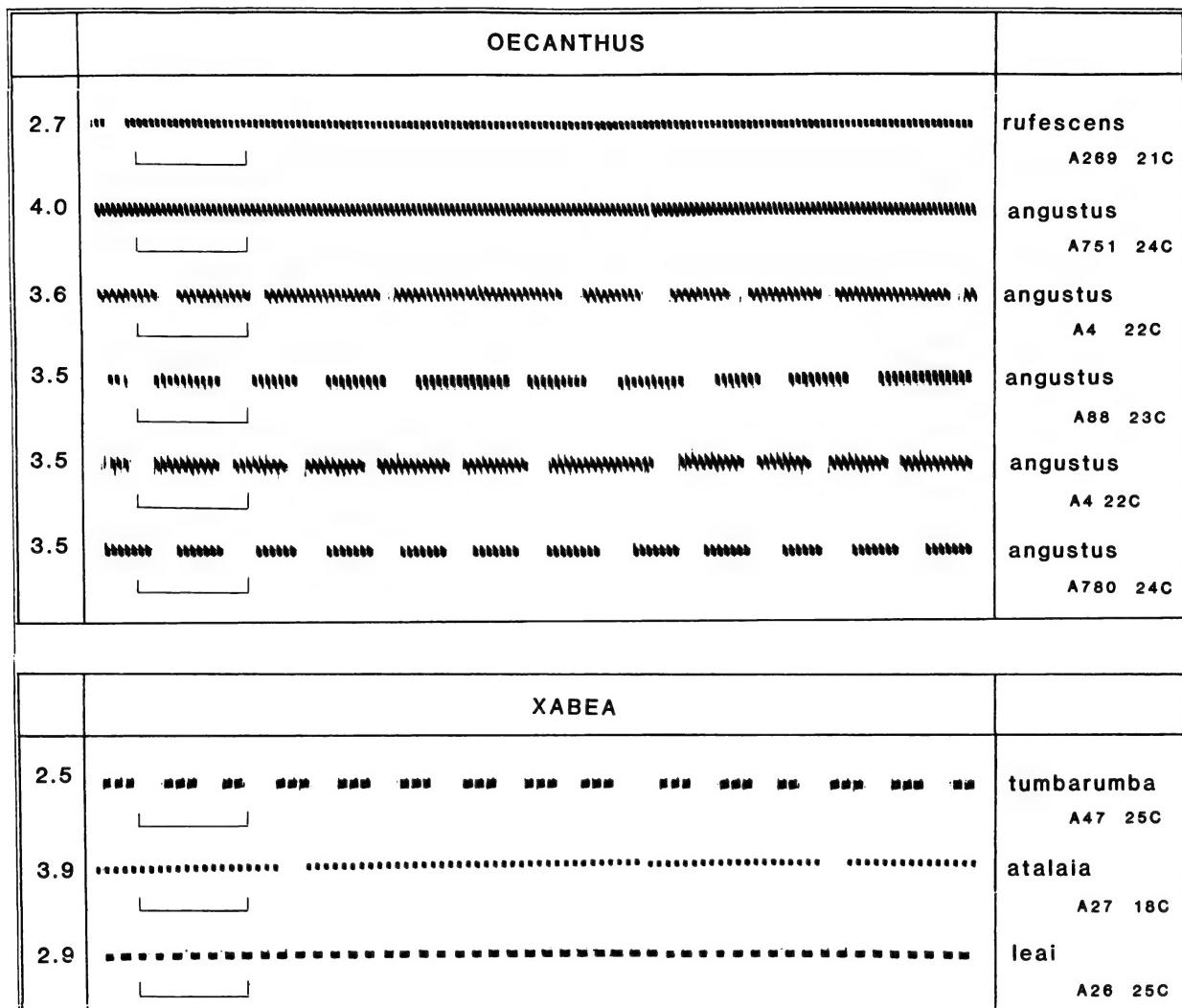
Oecanthus adyeri n. sp., Fig. 301C

RANGE. Type locality in Kimberley district, WA.

RECOGNITION. Males: Very pale, greenish. Body length to end of HW ca. 16 mm. File with 42 teeth (holotype). Tibia III with 2 outer and 3 inner subapical spurs. FW venation as in Fig. 301C. FW relatively narrower than in *D. angustus*—distance from file to end of FW 2.39 to 2.47 times greatest dorsal width of FW. Genitalia as in Fig. 301F.

Females: Body color as in male. Dorsal field of FW with 7 parallel veins running obliquely across field. Ovipositor about 3.93 times as long as pronotum. Tibia III with 2 or 3 outer (usually 2) and 3 or 4 inner (usually 3) subapical spurs. Body length 17–18 mm to end of HW's.

HOLOTYPE. ♂, Prince Regent River Reserve,

FIG. 300. *Oecanthus* and *Xabea* songs. Scale = 0.5 s.

15.17S 125.33E, WA, at light, 17 viii 1974 (W. J. Bailey and K. T. Richards) ANC.

SONG. Not known.

HABITAT. Probably grasses.

SPECIMENS. Holotype ♂ ANC. Same data, 1♂ 6♀ ANC.

Genus XABEA F. Walker

Xabea Walker 1869: 109. Type species: *Xabea decora* Walker 1869: 109, Sumatra, by monotypy.

According to Chopard (1968), this genus contains nine described species, seven from Indonesia, one from New Guinea, and one from Australia. We describe here three additional Australian species.

Chopard (1951: 462, 521) places *X. leai* Chopard (Cairns, Queensland) and *X. podoscirtoides* Chopard (New Guinea, Murray Island, Torres Straits) in this genus, but his key indicates that members of this genus have "serrulated" hind tibiae. We could not find serrations on the hind tibiae in our species. Dr. T. H. Hubbell has examined the type of *Xabea decora* in the British Museum for us and states that "The hind tibiae are smooth and convex above, setose below, without serrulations or denticulations." T. J. Walker (in litt.) states that a tree cricket brought to him from New Guinea by James E. Lloyd is apparently congeneric with *Neoxabea leptata* T. J. Walker 1967: 791 from Colombia. His de-

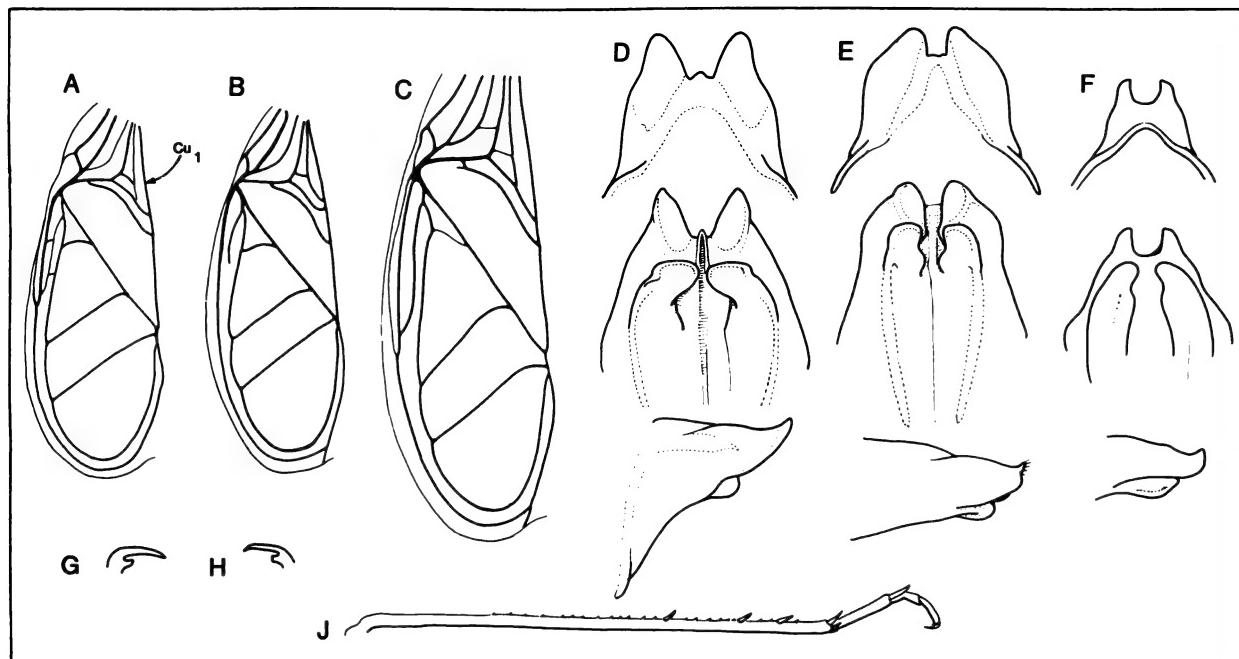


FIG. 301. *Oecanthus*. A, *rufescens* Rockhampton; B, *angustus* A-68; C, *adyperi* holotype. D-F, male genitalia (dorsal, ventral, lateral—top to bottom): D, *rufescens* Rockhampton; E, *angustus* A-68; F, *adyperi* holotype. G, *rufescens* tarsal claw; H, *angustus* tarsal claw; J, *angustus* outer tibia III A-68.

scription, and comparison by Alexander with the type of *N. lepta* (UMMZ), suggests that the Australian *Xabea* species may be congeneric with *N. lepta*.

The four Australian members of this genus have been found only in trees in fairly dense rain forests. Characteristically, they are not in the tallest trees but 10–30 feet above the ground, well below the canopy. Males, females, and several stages of juveniles have been located at night, motionless on the ventral surfaces of leaves. Males sing only at night and all males seen singing ($n=5$: 1–3 for each species collected) had the head, thorax, and front legs protruding upward through a small oval or round hole in a leaf, with the body bent so that the vibrating tegmina, more or less vertical to the mesothorax, were framed in the leaf hole. This behavior gives the calls of these species a peculiarly loud and resonant quality, evidently because the entire leaf surface is so positioned as to reflect and amplify the sound maximally. We do not know if the leaf holes are made or modified by the crickets, but holes similar to those being used are usually abundant where the crickets are found. Alexander (un-

published) has seen similar behavior by *Neoxabea bipunctata* singing on oak trees in Michigan (USA), and Walker (1969) reports such behavior in a Jamaican *Oecanthus* species.

RECOGNITION. Tibia III without spines or spurs but upper or hind face with thickened setae. Tarsal claws clearly cleft. Cerci distinctly shorter than tibia II, sometimes modified for clasping. Front of Cu₁ vein on male FW strongly bent and lying on lateral face of wings in resting position.

leai

1. File with 98–102 teeth ($n=2$).
2. Cerci sinuate (Fig. 307A).
3. Dorsum of head and pronotum with dark stripes.
4. Dorsal field of FW with brown markings.
5. Genitalia: Fig. 306C.

atatala

1. File with 78 teeth ($n=1$).
2. Cerci modified for clasping (Fig. 307CD).
3. Dorsum of head and pronotum with dark stripes.
4. Dorsal field of FW with brown markings.
5. Genitalia: Fig. 306AB.

tumbarumba

1. File with 68, 76 teeth ($n=2$).
2. Cerci straight, short (Fig. 307A).
3. Dorsum of head and pronotum entirely pale green.

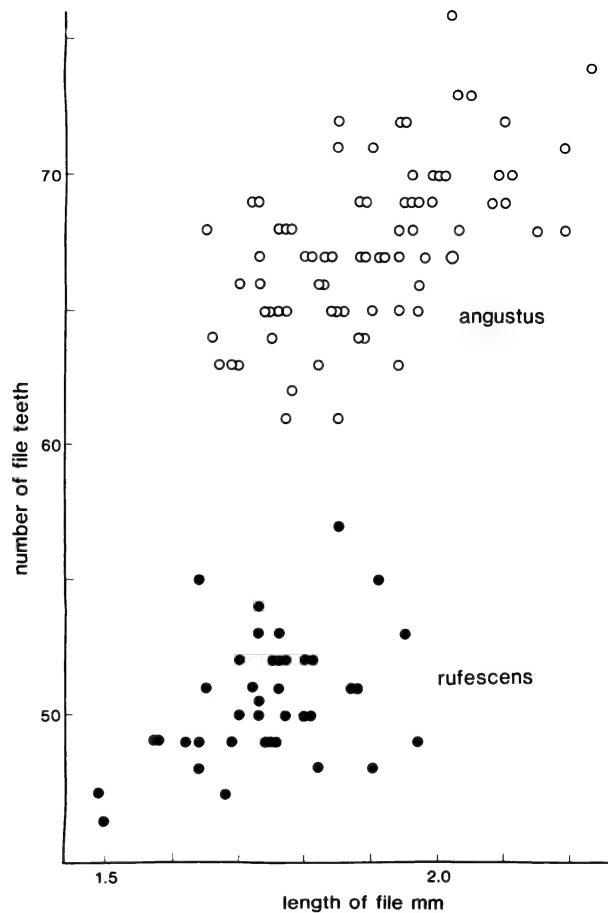


FIG. 302. Scatter diagram comparing stridulatory files of *Oecanthus rufescens* and *O. angustus*.

4. Dorsal field of FW entirely pale green.
5. Genitalia: Fig. 306E.

wyebo

1. File with 31 teeth ($n=1$).
2. Cerci straight, short (like *tumbarumba*).
3. Dorsum of head and pronotum entirely pale.
4. Dorsal field of FW with yellow or brown spots.
5. Genitalia: Fig. 306F.

***Xabea leai* Chopard, Figs. 306CD, 307BEHOPQ, 308BD**

Xabea leai Chopard 1951: 463, type from Cairns apparently lost, absent from the SAM and not in Paris as indicated by Walker (1966). Neotype male here designated from Mission Beach near Tully, QLD.

RANGE. Coastal rain forests of northern QLD.

RECOGNITION. Males: Cerci sinuate bearing a bump with numerous setae on inner face (Fig.

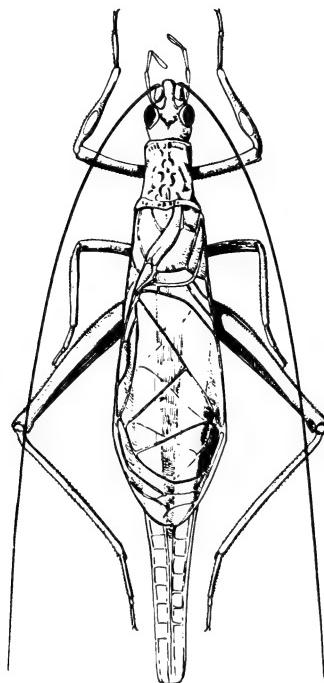


FIG. 303. *Xabea wyebo*.

307B). Dorsum of head with 2–4 longitudinal dark stripes; anteriorly these may be joined by larger dark patch (Fig. 307OPQ). Dorsum of pronotum with two narrow longitudinal stripes in posterior half. FW's with moderate to distinct dark markings as in Fig. 307P. File with 98–102 teeth ($n=4$). Genitalia as in Fig. 306CD.

Females: Similar to males in color. Cells of FW's sometimes brown, or at least distinctly darker than veins.

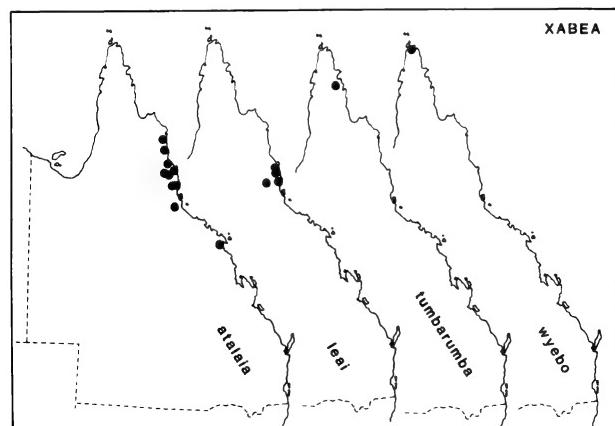
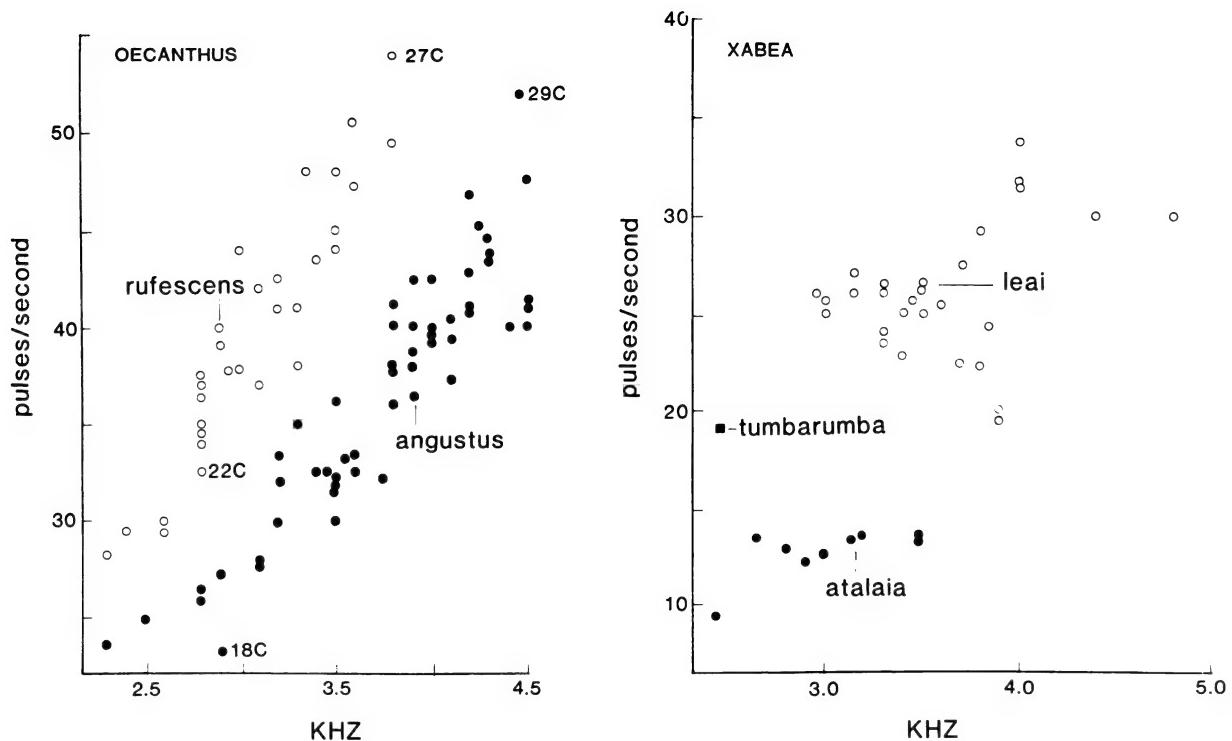


FIG. 304. *Xabea* distributions.

FIG. 305. Scatter diagrams comparing *Xabea* songs.

SONG. Fig. 300. Slow melodious trill, more or less unbroken, with unusual loudness and resonance owing to male inserting head and pronotum through leaf hole so that raised FW's more or less fit into hole and entire leaf surface his "bandshell." All three males seen singing in this position. Singing males usually more than six feet above ground, often far beyond reach. Males from A-62, A-287, and A-290 not collected. Songs taped there presumed to belong to *X. leai*.

		p/s	kps	°C
A-24	n=2	19.4, 20.0	3.9	20
A-24		13.3	3.2-3.5	ca. 20
A-26	n=2	12.2, 12.3	2.9	ca. 20
A-62		9.3	2.5	16
A-287		12.8-13.3	2.7-2.8	19
A-290		15.8	2.4	18

HABITAT. Rainforest trees, usually in smaller trees under main canopy.

SPECIMENS. Neotype ♂ ANC. Same data as holotype 1♂ 3♀ ANC, 1♂ ANSP. A-26 1♂ ANC.

***Xabea atalaia atalaia* n. sp. and subsp., Figs. 306B, 307CFKN**

RANGE. Forests of coastal QLD.

RECOGNITION. Males: Similar to *X. leai* but differing in structure of cerci which in this species are fitted for grasping (Fig. 307C). The two segments anterior to cerci also strongly modified in connection with grasping. *X. a. atalaia* differs from *X. a. elderra* mainly in structure of 9th tergite, male genitalia, and markings on dorsum of head (Fig. 307M). File with 78 teeth (n=1). Genitalia as in Fig. 306B. Body length to end of HW's 18 mm, femur III length 7.2 mm; tibia III 9.0 mm.

Females: Coloration similar to male. Body length to end of abdomen 14 mm; to end of HW's 20 mm; ovipositor broken.

HOLOTYPE. ♂, A-27, The Boulders, 4 miles west of Babinda, QLD, ANC.

SONG. Fig. 300. Continuous trill, only rarely and irregularly broken. Sings only at night, 5 feet or more above ground in foliage of certain trees. Males place heads into hole while singing much as described in *X. leai*.

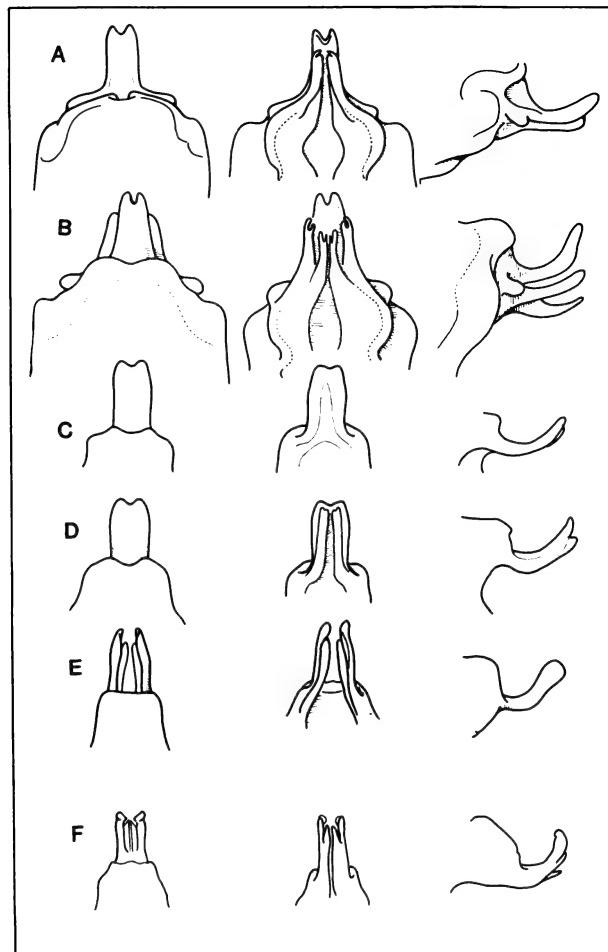


FIG. 306. *Xabea* male genitalia (dorsal, ventral, lateral—left to right). A, *atalaia elderra* A-59; B, *atalaia atalaia* A-27; C, *leai* Bramston Beach; D, *leai* A-24; E, *tumbarumba* A-45-46; F, *wyebo* holotype.

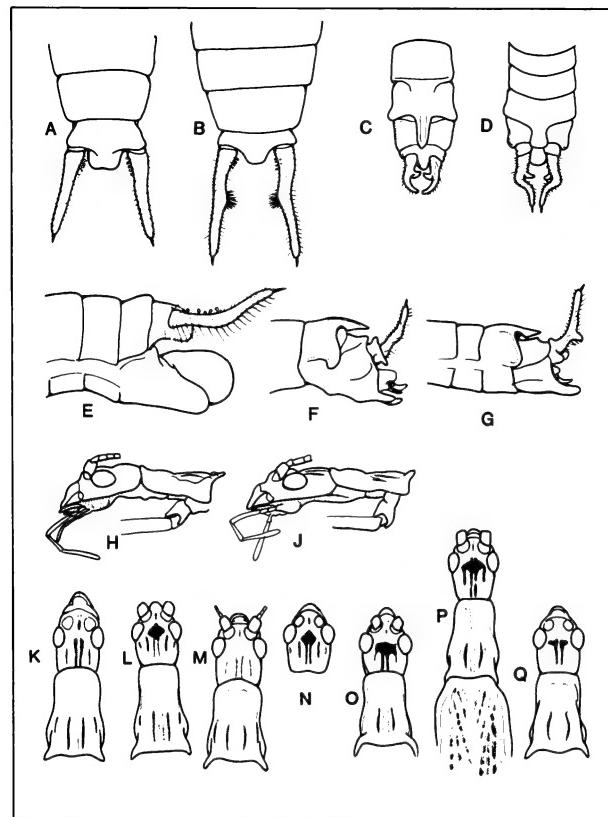


FIG. 307. *Xabea*. A–G, comparison of cerci and last abdominal segments: A, *tumbarumba* and *wyebo*; B, *leai* A-24; C, *atalaia atalaia* holotype; D, *atalaia elderra* holotype; E, *leai* Bramston Beach; F, *atalaia atalaia* holotype; G, *atalaia elderra* holotype. H, *leai* A-24; J, *atalaia elderra* A-59; K, *atalaia atalaia* ♀ A-27; L, same sp. ♂ A-27; M, *atalaia elderra* A-59; N, *atalaia atalaia* holotype; O, *leai* Bramston Beach; P, *leai* ♀ A-24; Q, *leai* ♂ A-24.

took a male and a female from a "milky tree with a horsechestnut-like leaf."

SPECIMENS. Holotype ♂ ANC. A-27 1♀ ANC.

***Xabea atalaia elderra* n. subsp., Figs. 306A, 307DGJM, 308C**

RANGE. Forests of coastal QLD.

RECOGNITION. Very similar to *X. a. atalaia* but males with slightly different 9th tergite and genitalia (Figs. 306A, 307D). File with 73–78 teeth. FW's with pale brown markings as in Fig. 307P. Dorsum of head and pronotum each with four narrow dark lines in both sexes (Fig. 307M). Body length ca. 19 mm to ends of HW's.

HABITAT. Rain forests. At the type locality we

	p/s	kps	°C
A-24–25 n=3	25.0–26.5	3.5	ca. 20
A-26	24.0–26.1	3.3	ca. 20
A-27	24.0	3.9	18
A-29 n=4	25.0–27.0	2.9–3.0	21
A-34	27.5	3.7	23
A-37 n=2	22.8, 23.5	3.3, 3.4	19
A-49	29.2	3.8	21
A-56	22.4–25.6	3.4–3.7	ca. 21
A-59	25.0	3.4	20
A-492 n=2	31.6	4.0	22
A-498	33.8	4.0	22

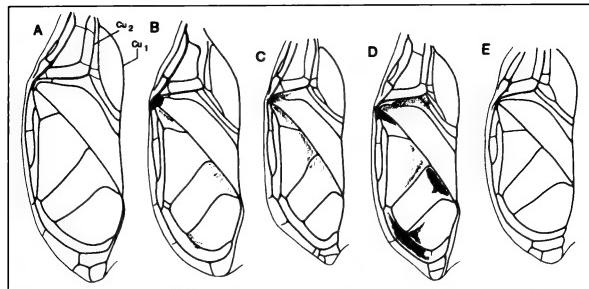


FIG. 308. *Xabea* male FW's. A, *tumbarumba* holotype; B, *leai* A-24; C, *atalaia elderra* A-59; D, *leai* A-26; E, *wyebo* holotype.

HOLOTYPE. ♂, A-59, 20 miles north of Daintree River, QLD, near ocean, 3 ix 1968, ANC.

SONG. See under *X. a. atalaia*.

HABITAT. See under *X. a. atalaia*.

SPECIMENS. Holotype ♂ ANC. A-59 1♂ 1♀ ANC, 1♂ ANSP.

Xabea tumbarumba n. sp., Figs. 306E, 307A, 308A

RANGE. Type locality in vicinity of Iron Range, QLD.

RECOGNITION. Males: Very pale, without dark stripes on dorsum of head and pronotum as in *X. atalaia* and *X. leai*. FW's also without brown markings. Cerci straight, not fitted for grasping (as in *X. atalaia*) and without an inner tuft of setae (as in *X. leai*). Male genitalia as in Fig. 306E. Body length to end of HW's ca. 16 mm.

Females: Similar to males in color. Body length ca. 17 mm to end of HW's, 12 mm to end of abdomen; ovipositor length 4.5 mm.

HOLOTYPE. ♂, A-45, vicinity of Iron Range, QLD, 11 viii 1968, ANC.

SONG. Fig. 300. Succession of 3-pulse chirps.

	p/s	ch/s	p/ch	kps	°C
A-45	19.2	3.5	3	2.5	25

HABITAT. Sang at night in fairly dry open forest about 8–10 feet above ground.

SPECIMENS. Holotype ♂ ANC. A-45 1♂ 1♀ ANC, 1♂ ANSP.

Xabea wyebo n. sp., Figs. 303, 306F, 307A, 308E

RANGE. Extreme northern Cape York.

RECOGNITION. Males: Very pale green, almost whitish. Most similar to *X. tumbarumba* and male genitalia similar to that species except that epiphallic lobes less rounded at extremity (lateral view). Cerci straight and not fitted for grasping (as in *X. tumbarumba* and unlike *X. leai* and *X. atalaia*). Dorsum of pronotum extremely bumpy. Differs from *X. tumbarumba* in having fewer than 40 file teeth (31 teeth, $n=1$) and in having very light brown spots on FW's. Body length ca. 15 mm to end of HW's; femur III length ca. 6 mm; tibia III ca. 6.8 mm; FW length ca. 8 mm.

Females: Similar to males in color. Head slightly yellowish-brown. Ovipositor 2.44 times as long as pronotum. Body length 17 mm to end of HW's; 15 mm to end of ovipositor; FW length 8.5 mm.

HOLOTYPE. ♂, Lockerbie, Cape York, QLD, 10–15 vi 1969 (G. B. Monteith) UQC.

SONG. Not known.

HABITAT. Collected at lights.

SPECIMENS. Holotype ♂ UQC. Same data as holotype, 3♂ ANC. Bamaga, Cape York, QLD, 4 iv 1964 (Common, Upton) 1♀ ANC.

SUBFAMILY CACHOPLISTINAE

Genus *CACHOPLISTUS* Saussure

Cachoplistus Saussure 1877: 325. Type species: *C. brunnerianus* Saussure 1877: 327.

This subfamily includes a single genus containing four nominal species, *C. rogenhoferi* Saussure 1877: 329 and *C. indicus* Chopard 1935: 293, both from Kashmir, India; and *C. brunnerianus* Saus-

sse 1877: 327 and *C. westwoodianus* Saussure 1877: 330, the former from Australia and the latter from "Nouvelle-Hollande?"

The types of these species are located as follows: *C. brunnerianus* (♀) and *C. rogenhoferi* (♂), Vienna; *C. indicus* (♀), London; *C. westwoodianus* ("mutilated" ♀—cf. Saussure 1877: 331), Oxford



FIG. 309. *Cachoplistus brunnerianus* female.

University Museum. The only other specimens in existence are evidently a male and female of *C. rogenhoferi* (Paris) and a female of *C. brunnerianus* (Paris). All of these specimens have been examined by Alexander, except the type of *C. westwoodianus*, which has apparently been lost. The Paris and Vienna specimens were photographed.

Chopard (1968) synonymized *C. indicus* under *C. rogenhoferi*. The types of *C. brunnerianus* and *C. indicus* seemed to Alexander extremely similar, enough so to be considered conspecific if they were from the same locales.

Members of this subfamily can be distinguished from all but *Acanthoplistus* species (Scleropterinae) by the strongly carinate pronotum, which in *C. brunnerianus*, at least, is unique in being concave on both the dorsal and lateral fields. *Cachoplistus* is the only large Australian cricket (if indeed it does occur in Australia) in which the head is only about half as wide as the pronotum, and the pronotum sharply narrowed anteriorly. All of the tibiae are quadrate with four sharp longitudinal carinae. The fore tibiae have large internal tympana and no external ones.

Nothing else seems to be known of these remarkable insects, which in our view seem possibly mimics of a large, ill-tasting coriaceous bug. We did not encounter *Cachoplistus*, and no specimens

have been taken in Australia since 1877; there are none in Australian collections. It would be easy to wonder if the Australian records are in error, the material so labelled perhaps from India. We note, however, that nearly 25 cricket sounds were taped by us in the rain forests of Queensland for which we were unable to secure specimens. Among these were several low-pitched loud trills, undoubtedly made by large insects and resembling mole cricket sounds, which seemed to come only from the tops of very tall trees with large crowns filled with masses of epiphytic plants. We speculated that they might indeed represent mole crickets, although high flying by these insects would be surprising even if they could breed in such locations. At least one unidentified low-pitched trill, on Mount Tambourine south of Brisbane, emanated from a dense tangle of heavy weeds and brush, a more likely location for a cricket mimicking a large bug.

The long straight ovipositor of these species suggests oviposition in the soil or in rotten wood. Internal auditory organs only suggest life in close groups on vegetation or in burrows: trends in this direction occur both in burrowing Gryllinae and in large vegetation-inhabiting Eneopterinae, Podoscirtinae, and Itarinae.

Whether *Cachoplistus* occurs at all in Australia, whether it mimics an ill-tasting hemipteran, and whether it is responsible for any of the intriguing loud, musical trills we could not identify, are questions that will remain unanswered until someone has an unusual chance to examine some of the involved habitats in detail. We have tried here to present sufficient information to enable a collector to identify *Cachoplistus* if it is located or relocated in Australia.

Cachoplistus brunnerianus Saussure, Fig. 309

Cachoplistus brunnerianus Saussure 1877: 327. Type ♀, Australia, VM. Type examined.

Cacoplistes brunnerianus, Chopard 1951. Transferred to *Cachoplistus* by Chopard 1968: 253.

This species is listed from "Australia" (see generic discussion above).

Cachoplistus westwoodianus Saussure

Cachoplistus westwoodianus Saussure 1877: 330. Type ♀, Nouvelle-Hollande, Oxford University Museum. Examined.

This species, like the former, may not be from Australia (see generic discussion).

SUBFAMILY MOGOPLISTINAE

The Mogoplistinae is a diverse group in Australia, composed of 11 genera and 80 known species. The species occur from rain forest to desert and from the ground to the topmost branches of the tallest trees. Unlike most crickets they tend to run along bark or twigs or over leaves when disturbed. Tree-top species do not leap from their perches even when shaken very hard. We felled a 40-foot tree on one occasion and captured the single male heard in the topmost branch of the upright tree when he commenced song again in the fallen tree. Many species sing during the daytime, others are strictly nocturnal. Heavy foliage, vines, and dense tangles of dead stems and leaves or brush are commonplace locations of singing males. As with many genera, the habitat of a species often seems as well characterized by height from the ground as by anything else.

Because of the high pitch of many mogoplistine songs, as well as the nature of their habitats, singing males are often extremely difficult to trace. Partly because of their small size in relation to twigs, leaves, and other sound-blocking objects, ventriloquism is more prevalent than in other groups. We have often searched at length on and near the ground in a seemingly dense colony before discovering that all of the singers were in the tops of tall trees. Males are also difficult to approach in tangled vegetation or stems without silencing them by shaking the tangle, and singers often run short distances between songs. This behavior is related to the characteristic production of groups of chirps or trills in these species, the groups separated by intervals of a few seconds during which the singer often changes position or runs a short distance. On one occasion we watched a male that had encountered a female and then lost her dash in short runs back and forth, singing between runs with the interval between chirp groups as well as the length of groups reduced.

RECOGNITION. Body length 4–13 mm. Body covered with scales. Pronotum relative long (especially in males). Male FW's rarely reaching end of abdomen. HW's absent. Females always wingless. Hind tibiae without movable spurs. Clypeus extending onto dorsum of head; entire rostrum composed of clypeus.

NOMINA DUBIA

The descriptions and types of four of Chopard's *Ornebius* species are insufficient to distinguish among a number of Australian *Ornebius* species. Females are almost impossible to distinguish unless they can be positively associated with males. Because of such difficulties we declare the following names *nomina dubia*:

Ornebius laevicauda Chopard 1951: 441. Holotype ♀, New South Wales, Ulong, East Dorrigo, iv 1933 (W. Herron) AM.

Ornebius denticauda Chopard 1951: 440. Holotype ♀, Brookfield, Queensland, 16 iii 1927 (H. Hacker) QM.

Ornebius latifrons Chopard 1951: 442. Holotype ♀, Waterfall Gully, South Australia, 23 vi 1884 (Tepper) SAM.

Ornebius parvus Chopard 1951: 443. Holotype ♀, Melville Island (W. D. Dodd) SAM.

Liphoplus parvithorax Chopard 1925: 24. Holotype ♀, Christmas Creek, QLD, SM.

KEY TO AUSTRALIAN GENERA OF MOGOPLISTINAE

1. FW nearly hidden by pronotum (Fig. 343). Small dark insects *Pongah*
FW extending well beyond pronotum; size and color variable 2
2. FW entirely black or dark brown and much of anterior portion of mirror hidden beneath pronotum *Kiah*
FW not entirely black, with distinct light and dark areas (if black, anterior portion of mirror almost entirely exposed) 3
3. Narrow bodied (Fig. 331AB) and small; body length at least 3.5 times greatest width of body (through tegmina) and body length less than 7.5 mm *Marinna*
Not fitting above description 4
4. Body length less than 7 mm; pronotal length less than 2.1 mm; head reddish, pronotum yellowish; pronotum viewed from above with convex sides (Fig. 331C) *Biamia*
Not fitting all of the above description 5
5. Small (less than 7.5 mm); body color dark brown to black; maxillary palpi dark brown; FW with anterior and posterior transverse dark bands, and a pale central band *Kalyra*
Not fitting above description 6
6. Genital processes very dark brown or black or body length more than 3.5 times greatest body width 7
Genital processes brown to pale, body length less than 3.5 times greatest body width 9
7. Posterior margin of FW with a continuous red band;

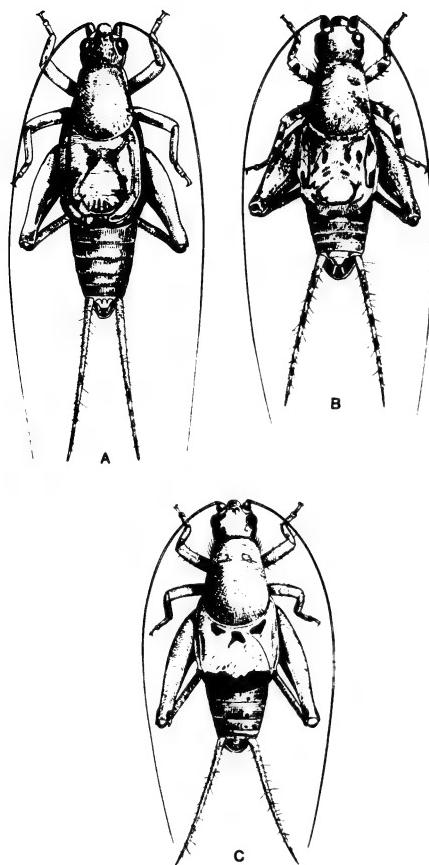


FIG. 310. *Ornebius*. A, *curtipalpis* (Wandella Group); B, *baulumia* (Illaroo Group); C, *abminga* (Abminga Group).

- 10th tergite of abdomen very dark centrally (Fig. 328AB) *Talia*
- Posterior margin of FW with several spots, or margin brown or black but not red in color, and 10th tergite not as above 8
- 8. Body length more than 9.2 mm; body length at least 3.75 times greatest body width; femur III more than 4.7 mm in length *Collendina*
Body length less than 9.2 mm; body length less than 3.5 times body width; femur III length less than 4.7 mm *Maroa*
- 9. Tergum between bases of cerci black (Fig. 322D-G) *Lara*
Tergum between bases of cerci brown or at least as pale as more anterior portions 10
- 10. Legs I and II strongly banded (Fig. 310B) *Ornebius* (Illaroo Group)
Legs I and II weakly banded or unbanded 11
- 11. FW with continuous dark band across posterior margin; anterior field either without dark spots or with one to three distinct dark spots (Fig. 310C); top of abdomen darker than pronotum; length of pronotum always

more than 1.2 times length of FW at center
..... *Ornebius* (Abminga Group)
FW with scattered indefinite dark markings on dorsal surface and usually with several dark marks along posterior margin (Fig. 312). Top of abdomen usually as light or lighter than pronotum; length of pronotum usually less than 1.1 times length of FW at center
..... *Ornebius* (Wandella Group)

Genus ORNEBIUS Guerin

Ornebius Guerin 1844: 331. Type species: *Ornebius*.

This is the largest mogoplistine genus in Australia with 29 known species, all but two of them new.

RECOGNITION. Body length more than 7.5 mm. Last dorsal segment of abdomen not black between cerci. Genital processes brown to pale brown or whitish (not black). Posterior margin of FW's with continuous brown or black band (not red) or with 3 darkened areas. Tibiae I and II slightly or strongly banded. Front of mirror not hidden beneath pronotum.

The Australian members of the genus fall into three species groups.

Wandella Group

1. Legs I and II only faintly banded.
2. Face not strongly banded.
3. 10th tergite of abdomen usually with two tufts of setae near center (Fig. 312Y-C'); in some species these appear spine-like.
4. FW's usually with 2 or 3 dark markings along posterior margin, and with indistinct dark markings scattered over remainder (Fig. 312).

Illaroo Group

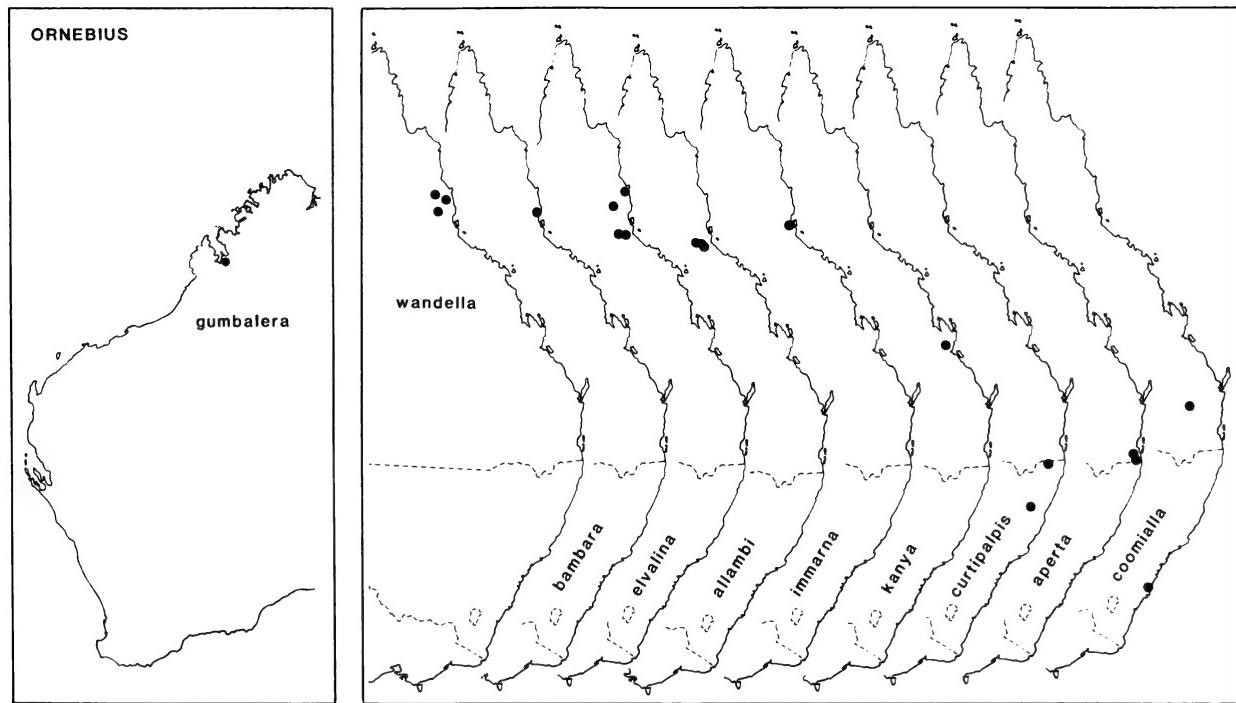
1. *Legs I and II strongly banded* (Figs. 310B, 316RSU).
2. Face usually with contrasting markings.
3. 10th tergite of abdomen usually with two tufts of setae near center (Fig. 317A-L).
4. FW's often with 3 dark marks along posterior margin and indistinct dark markings scattered over remainder (Fig. 316).

Abminga Group

1. Legs I and II unbanded or faintly banded.
2. Face without contrasting dark markings.
3. 10th tergite without tuft of setae.
4. *FW's with continuous dark band along posterior border* and anterior field with 1 or 3 dark spots (both FW's viewed together) (Fig. 319).

WANDELLA GROUP

These species inhabit mainly forested areas of eastern and northeastern Australia. One species, *O. gumbalera*, is from Derby, WA. They are among

FIG. 311. Distributions of *Ornebius* Wandella Group species.

the largest species in the genus, and in alcohol straw-yellow to red-brown in color. The head, pronotum, and abdomen are roughly similar in color. In some species the top of the abdomen is slightly paler than the pronotum. The face of most species

is not contrastingly marked. The FW's have several (usually 3) dark marks along the posterior margin and indefinite dark markings anteriorly (Fig. 312A-G). Occasional species have a single transverse band along the posterior margin. Most species have

TABLE 31. Body proportions in the Wandella Group. BL, body length; PL, median pronotal length; FWL, exposed forewing length; AL, exposed abdomen length; FWW, forewing width; RW, rostral width; BW, body width; RL, rostral length; ML, mirror length; MW, mirror width; FL, femur III length; CL, cercal length; OL, ovipositor length; SW, scape width; HW, head width; H, holotype; P, paratype; E, example.

		No. file teeth	BL BW	PL FWL	HW RW	RW RL	RW SW	FWL FWW	ML MW	BL (mm)	FL (mm)
wandella	H	166-196 n = 4	2.88	1.09	3.33	1.76	1.27	0.94	0.97	9.2	4.5
bambara	H	165	3.28	1.07	3.41	1.37	1.29	0.98	1.02	9.6	4.6
elvalina	H	341	2.60	0.90	3.36	1.7	1.47	1.00	0.97	9.3	4.5
coomialla	H	210	3.06	0.94	2.72	1.59	1.80	1.05	1.11	8.4	4.0
	P	—	3.06	1.01	2.87	1.72	1.72	1.01	1.07	8.7	4.0
allambi	H	221	2.67	1.04	3.25	1.50	1.50	0.91	0.95	8.9	4.2
curtipalpis	E	182	3.17	1.11	3.26	1.53	1.53	0.91	1.00	9.3	4.4
	P	—	3.31	1.00	3.11	1.53	1.47	0.90	0.95	9.7	4.3
	P	—	—	—	3.30	1.80	1.53	0.96	1.02	—	4.6
kanya	H	143	3.15	1.26	2.46	2.16	2.00	0.84	1.05	6.8	3.4
aperta	H	166	3.20	1.01	3.08	1.60	1.50	0.94	0.98	9.1	4.4
immarna	H	280	3.16	0.97	3.78	1.44	1.15	0.97	1.08	10.0	4.8
gumbalera	H	249	—	1.00	2.92	1.78	1.67	0.96	1.01	8.3	3.9

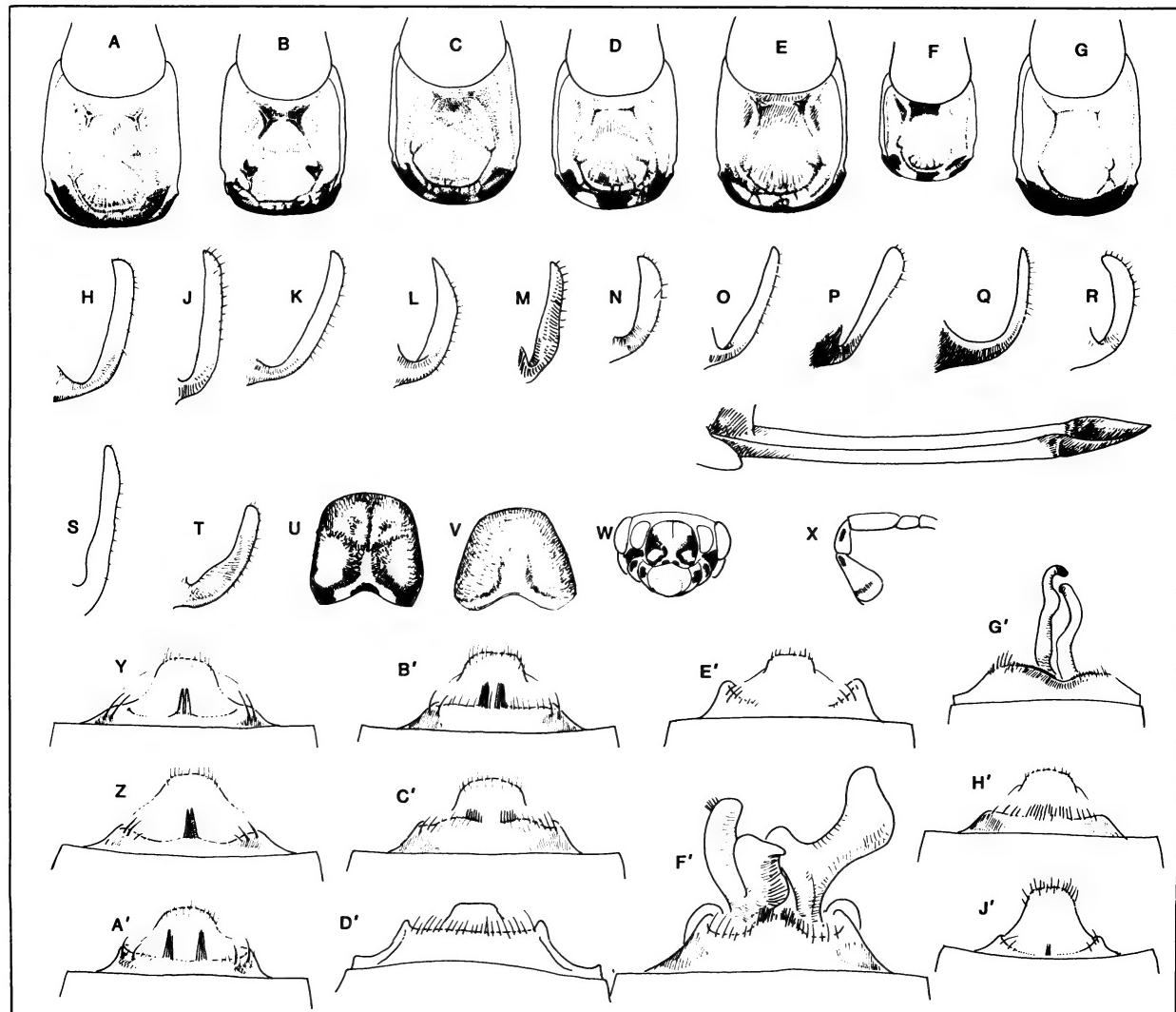


FIG. 312. *Ornebius* Wandella Group. A–G, forewings: A, *wandella*; B, *aperta*; C, *wandella*; D, *wandella*; E, *curtipalpis*; F, *kanya*; G, *bambara*. H–T, male genital processes: H, J, K, *wandella*; L, *curtipalpis*; M, *gumbalera*; N, probably *nigromaculatus* (Abminga Group); O, *coomialla*; P, *aperta*; Q, *kanya*; R, *attunga*; S, *allambi*; T, *bambara*. U, *coomialla* ♂ frons; V, *wandella* ♂ frons; W, *kanya* ♂ face; X, *immarna* max. palp. Y–J', male 10th abdominal tergite (top view): Y, *wandella*; Z, *wandella*; A', *curtipalpis*; B', *bambara*; C', *allambi*; D', *gumbalera*; E', *aperta*; F', *elvalina*; G', *immarna*; H', *coomialla*; J', *kanya*.

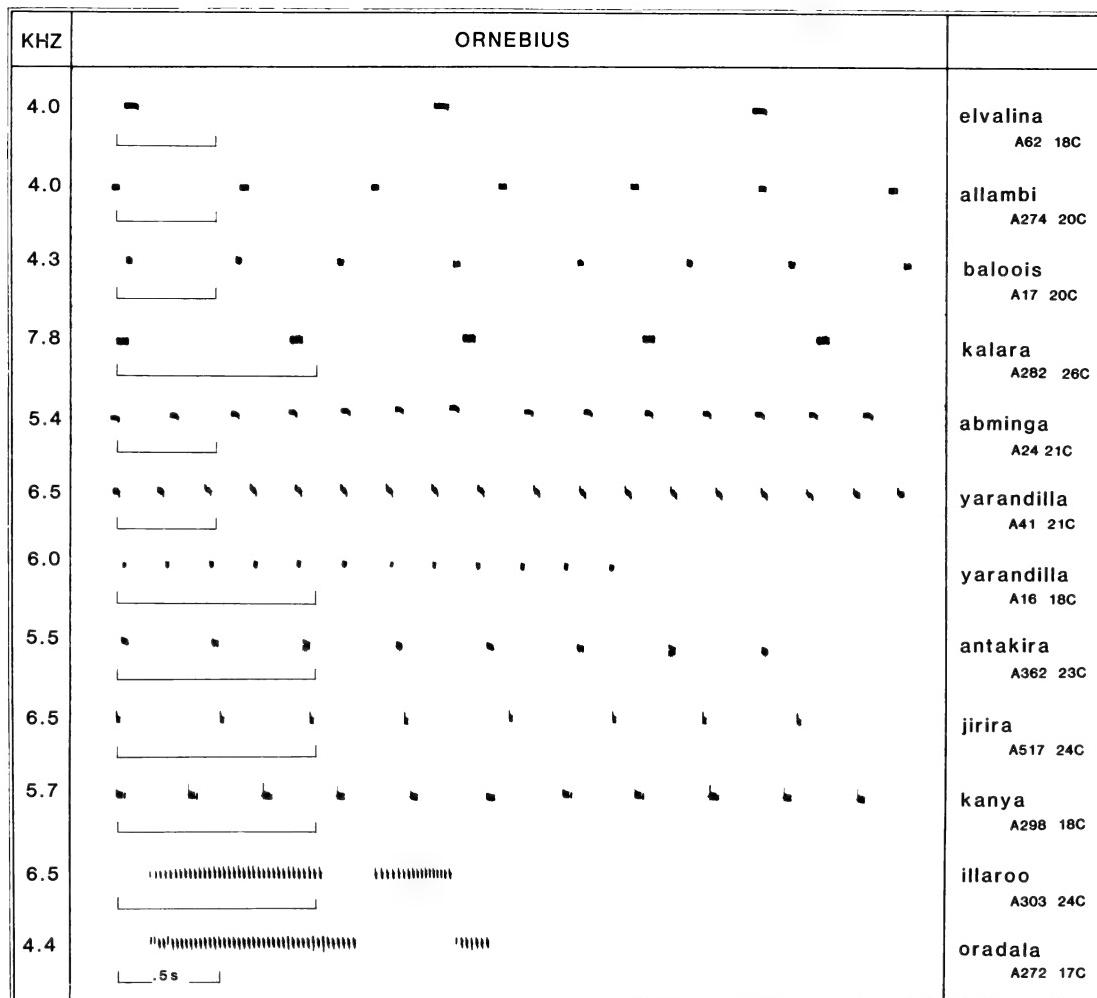
stridulatory files with fewer than 200 teeth. The legs, particularly the tibiae, are only faintly banded, thus distinguishing this group from the Illaroo species group. The genital processes are light brown or pale. The 10th tergite of the abdomen has two tufts of setae near the center, and in some species these tufts appear spine-like.

KEY TO MALES OF WANDELLA GROUP

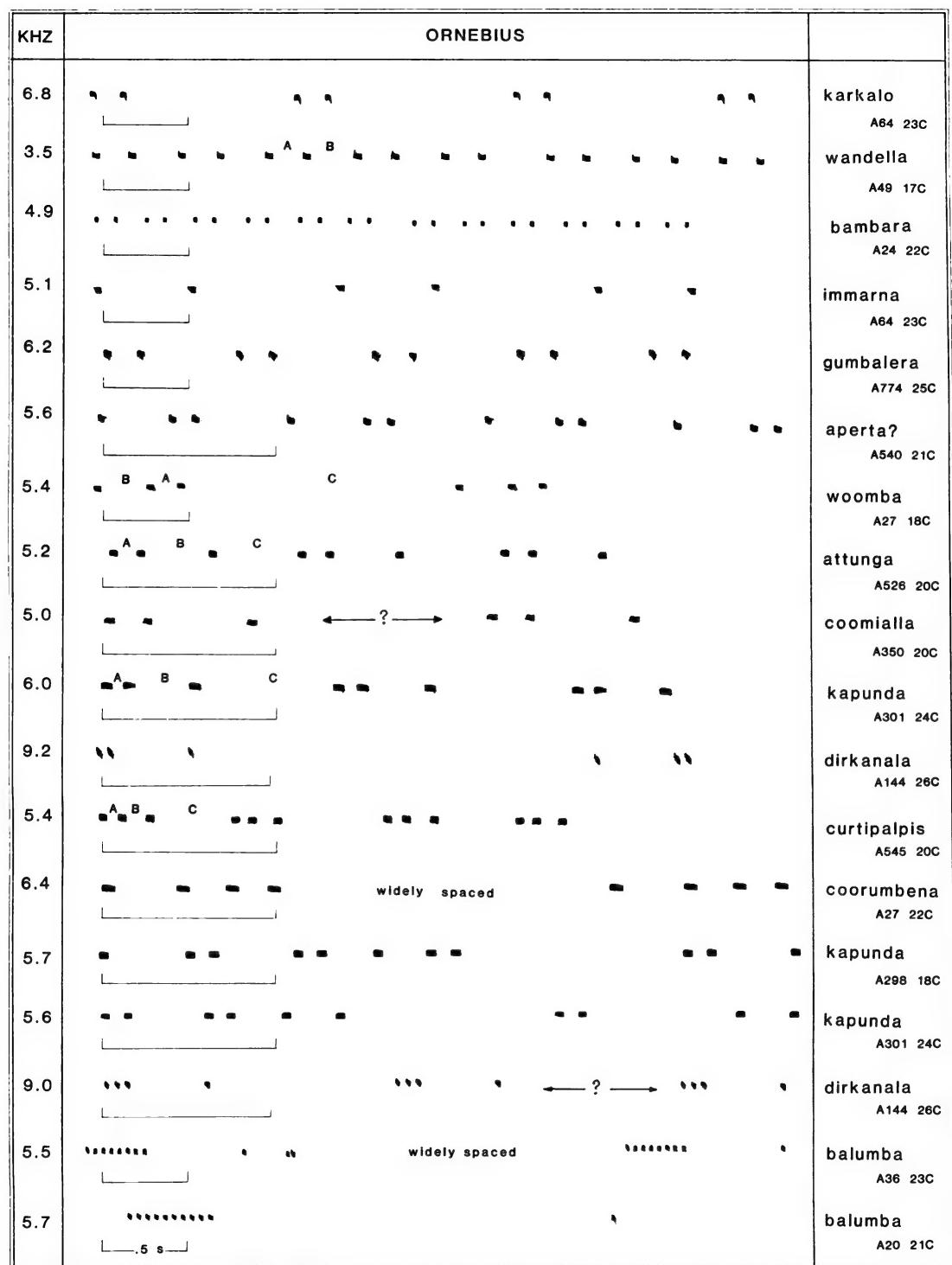
1. Genital processes asymmetrical (Fig. 312F'G'). File with more than 250 teeth 2

Genital processes symmetrical. File with fewer than 250 teeth

2. 10th tergite as in Fig. 312F. FW length about 2.5 times length of exposed abdomen. File with ca. 341 teeth. (Atherton, Millaa Millaa region of QLD) *elvalina*
- 10th tergite as in Fig. 312G. FW length less than 1.5 times length of exposed abdomen. File with ca. 280 teeth. (Vicinity of Ingham, QLD) *immarna*
3. Genital processes very slender (Fig. 312J). 10th tergite as in Fig. 312J. File with ca. 143 file teeth with 100 teeth/mm at center of file. (Vicinity of Rockhampton, QLD) *kanya*

FIG. 313. Songs of *Ornebius* species. Scale = 0.5 s.

- Genital processes not as above and otherwise not fitting above description 4
4. Posterior margin of 10th tergite of abdomen with two tufts of setae (sometimes almost spine-shaped Fig. 312YZA'B') 5
- 10th tergite of abdomen without tufts of setae (Fig. 312D'H') 8
5. FW length at least 1.5 times length of exposed abdomen 6
- FW length at most 1.3 times abdominal length 7
6. 10th tergite of abdomen with two spine-like projections (Fig. 312YZ). File with fewer than 180 file teeth. (Atherton region of QLD) *wandella*
- 10th tergite of abdomen without two spine-like projections (Fig. 312C'). File with ca. 221 teeth. (Mt. Spec region of north QLD) *allambi*
7. 10th tergite of abdomen as in Fig. 312A'. Rostral width more than 1.40 times width of basal antennal segment. Each FW dark at posterior lateral corner, but pale at posterior medial corner (Fig. 312E). File with ca. 182 teeth. (Mountains of northeastern NSW) *curtipalpis*
- 10th tergite of abdomen as in Fig. 312B'. Rostral width less than 1.3 times width of basal antennal segment. FW with more or less continuous dark band along posterior margin (Fig. 312G). (Tully region of north QLD) *bambara*
8. FW length more than 1.4 times abdominal length. File with ca. 210 teeth. (Macquarie River region of NSW) *coomialla*
- FW length less than 1.1 times abdominal length. File with fewer than 180 or more than 240 teeth 9
9. Posterior margin of FW with 3 distinct dark spots. Posterior edge of each FW with a lateral, a central, and a medial dark mark. Legs dark or banded. (Mt. Tamboorine region of SE QLD) *aperta*
- Posterior margin of FW without 3 distinct dark marks.

FIG. 314. *Ornebius* songs. Scale = 0.5 s.

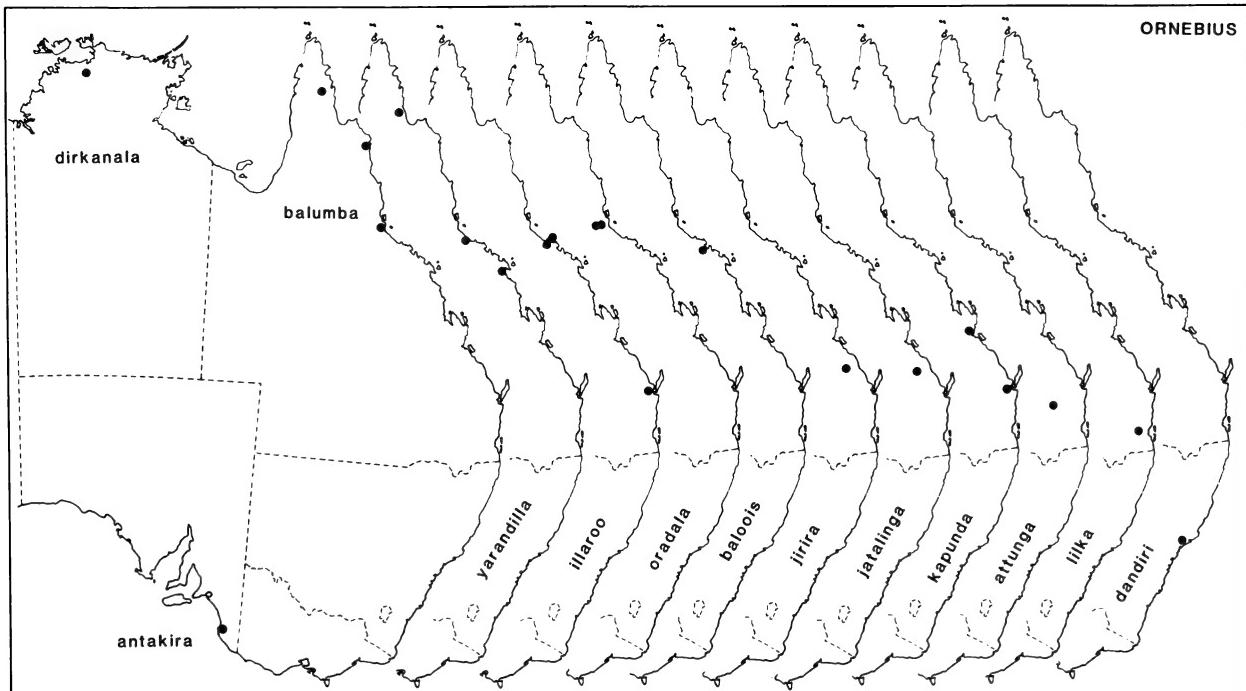


FIG. 315. Distributions of *Ornebius* Illaroo Group species.

Each FW darkest at posterior lateral corner becoming pale in posterior medial corner. Legs pale, unbanded.
(Derby region of WA) *gumbalera*

Ornebius wandella n. sp., Fig. 312ACDHJKVYZ

RANGE. Forests of northcentral coastal QLD.

RECOGNITION. Males: General body color rusty brown. FW's with scattered dark markings. Dorsum of head and rostrum light brown or yellowish, area just behind transverse suture and region between antennal sockets and eyes dark brown; area behind and below eyes with dark brown scales. Antennal scape with dark brown scales. Maxillary palpi uniformly brown except distal end nearly white. Pronotal disk reddish brown with symmetrical series of lighter spots and rings (these may be less conspicuous when scales have not been removed). FW's patterned as in Fig. 312AC. Lateral field of FW pale dorsally, dark brown ventrally. File with 166–196 teeth ($n=4$). Femora I and II yellowish with brown scales; scales not arranged in distinct bands. Tibiae I and II with pale yellow background but mostly covered with brown scales arranged in two indistinct broad bands, one in proximal half and one in distal half. Femur III with yel-

lowish background and mostly covered with brown scales arranged in longitudinal rows. Tibia III darker than femur, especially in area between spines which is covered with dark brown scales; this dark band interrupted by short light band in 1st quarter of tibia. Dorsum of abdomen brown and with black spots; 6th and 7th segments each with transverse row of 4 black rings of scales and with a long seta emerging from each ring; 8th segment with two distinct spots; 9th and 10th segments with none. Last dorsal segment before cerci darker than preceding; area between bases of cerci pale. Tenth segment (Fig. 312YZ) pale in center and with two central brown spine-like projections pointing posteriorly from midline. Sternum lighter than tergum, becoming darker posteriorly. Genital processes brown, curving slightly outward at distal end. Cerci yellowish, with uniformly scattered brown scales. Holotype measurements in Table 31.

Females: (based on one female from A-288). Color as in male but with lighter scales on head and pronotum. Little or no banding present on front legs. Femur III length 1.56 times tibial length. Top of abdomen with very indistinct dark spots. Ovi-

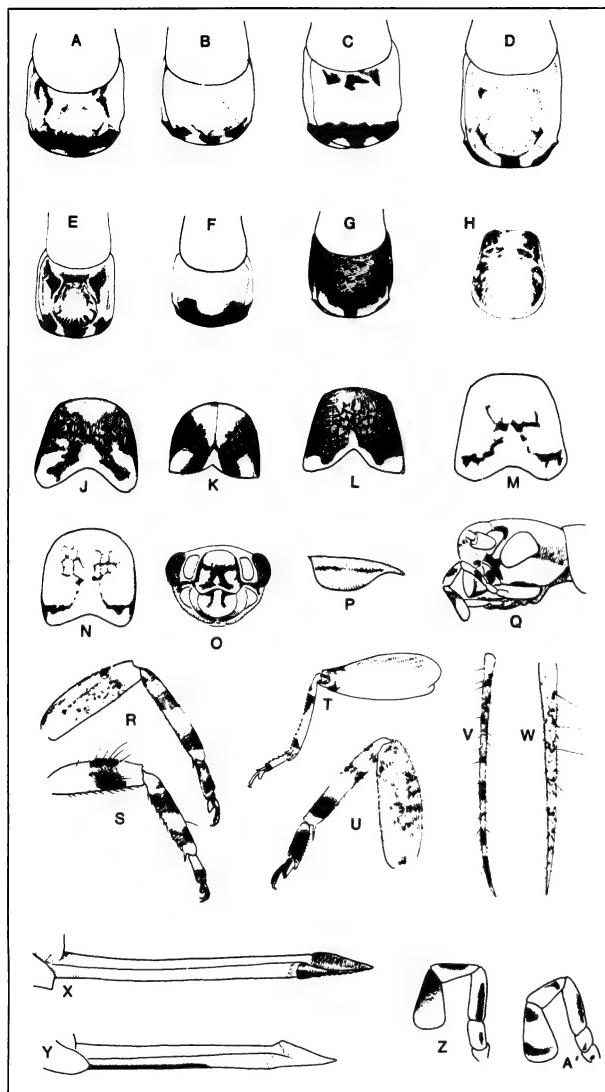


FIG. 316. Illaroo Group of *Ornebius*. A-G, forewings: A, *jatalinga*; B, *antakira*; C, *baloois*; D, *balumba*; E, *jirira*; F, *dirkanala*; G, *yarandilla*. H, illaroo ♂ pronotum. J-N, male frons: J, *balumba*; K, *yarandilla*; L, *balumba*; M, *attunga*; N, *likka*. O, face of illaroo ♂; P, lateral view of *oradala* ♂ pronotum; Q, *dirkanala* ♂ head; R, *likka* leg I; S, *likka* leg II; T, illaroo leg III; U, *jatalinga* leg I; V, *balumba* ♂ cercus; W, illaroo ♂ cercus; X, *balumba* ovipositor; Y, *jatalinga* ovipositor; Z, *yarandilla* max. palp; A', illaroo max. palp.

positor 2.2 times as long as pronotum. Body length 9.0 mm; femur III 4.8 mm; cerci 6.8 mm; ovipostor 4.3 mm.

VARIATION. Male from A-288 had similar song and 166 file teeth, but possesses three dark spots at

posterior margin of tegmina and has darker scales on pronotum, abdomen, and legs. Male from A-62 (nr. Millaa Millaa) has 177 file teeth, and slightly different song in one portion of which the pulses are single and in another portion of which the pulses become slightly paired. Male from the Boulders near Babinda has 196 file teeth.

HOLOTYPE. ♂, A-49, Tolga, QLD, 14 viii 1968, ANC.

SONG. Fig. 314. Usually consists of barely paired pulses. Male from A-62 varied song, switching from unpaired pulses to barely paired pulses. At A-49 each group of pulses usually ended with single pulse; intervals between groups around 20 seconds. Song of male from A-27 consisted of paired series of pulses; from 4 to 6 groups of pulses delivered in each song and 3 songs delivered in 10-second period.

	p/s	ch/s	kps	°C
A-49	4.5	1.9	3.5	17
A-287	4.7	2.8	3.8	19
A-62	4.7	2.7	3.9	18

HABITAT. A rainforest species, commonly found about head-high in tangles of undergrowth and dead leaves.

SPECIMENS. Holotype ♂ ANC. A-49 1♀ ANC. A-27 1♂ ANSP. A-62 1♂ 1♀ ANC. A-288 1♂ 1♀ ANC.

Ornebius bambara n. sp., Fig. 312GTB'

RANGE. Type locality in northcentral coastal QLD, vicinity of Tully.

RECOGNITION. Males: General body color yellowish; head, pronotum, and most of FW similar in color. Face, pale ventrally, darker dorsally, area between lower front edge of eyes and pleurostoma with dark markings. Posterior margin of pronotum with light scales. Posterior margin of FW's with continuous dark band, but posterior margin of each FW with a pale spot between center line and posterio-medial corner. Very faint darkened areas are scattered about FW surface as in *O. wandella*. Lateral field dark brown ventrally, pale dorsally. File with 165 teeth ($n=1$). Legs similar to *O. wandella*. Dorsum of abdomen very pale near FW, becoming distinctly darker posteriorly. Tenth tergite with dark patch next to inner base of each cercus, light centrally; with two tight bunches of setae separated

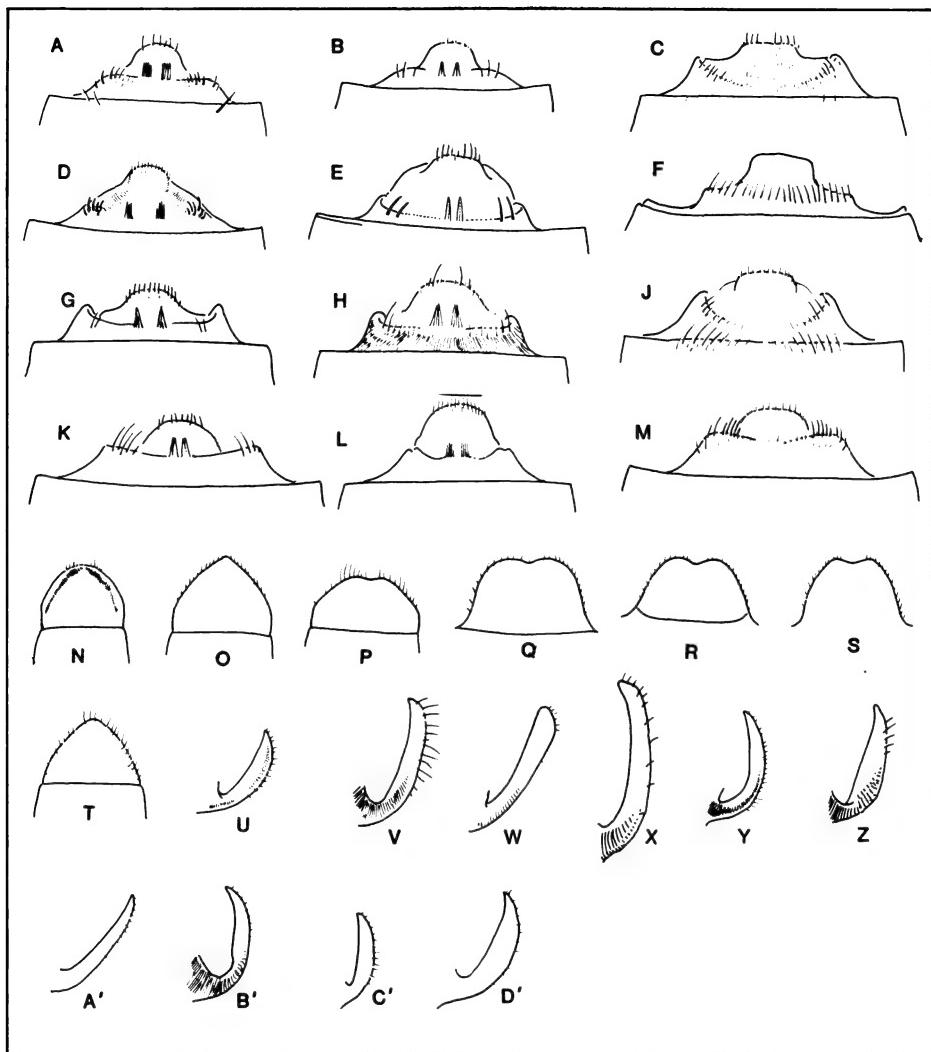


FIG. 317. Illaroo Group of *Ornebius*. A–M, male 10th abdominal tergites: A, illaroo; B, yarandilla; C, lilka; D, oradala; E, antakira; F, kapunda; G, jirira; H, jatalinga; J, attunga; K, dandiri; L, dirkanala; M, balumba. N–T, subgenital plates: N, illaroo ♂; O, lilka ♂; P, balumba ♂; Q, lilka ♀; R, balumba ♀; S, jatalinga ♀; T, oradala ♀. U–D', male genital processes: U, illaroo; V, antakira; X, kapunda; Y, oradala; Z, jirira; A', balumba; B', jatalinga; C', yarandilla; D', dandiri.

from one another by a distance less than half their length (Fig. 312B'). Venter of abdomen very pale anteriorly, last two segments darkest. Penultimate segment with dark brown posterior edge. Genital processes pale brown. Cerci uniformly scattered with brown scales, not distinctly banded. Holotype measurements in Table 31.

HOLOTYPE. ♂, A-24, nr. Mission Beach, QLD, 1 viii 1968, ANC.

SONG. Fig. 314. 4 or 5 double pulse groups delivered across 6–8 seconds. Male taped briefly at Ku-

randa waited 7 seconds between groups of paired pulses.

	p/s	ch/s	kps	°C
A-24	7.7	3.1	4.5	22
A-24	8.7	3.3	4.9	22

HABITAT. Males sing at night 4–5 feet above ground in bushes and saplings in rain forests.

SPECIMENS. Holotype ♂ ANC.

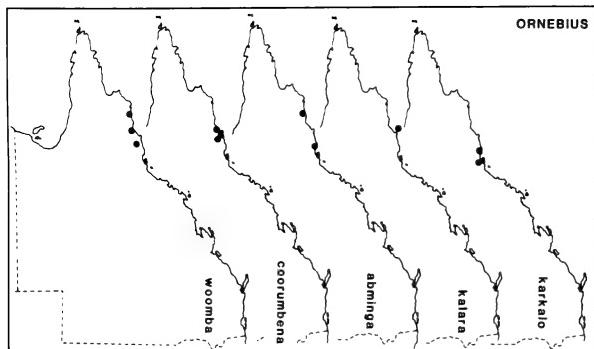


FIG. 318. Distributions of *Ornebius* Abminga Group species.

Ornebius elvalina n. sp., Fig. 312F'

RANGE. Forests of northcentral coastal QLD.

RECOGNITION. Males: Similar to *O. wandella* but with very broad FW's and with asymmetrical and bifurcate genital processes. Face rusty brown. Scales behind eyes darker than scales on top of head. Background color of pronotum orange-brown and partly covered with brownish scales; posterior margin with both light and dark scales. Posterior margin of FW's with three dark spots, central one reaching posterior margin. File with 341 teeth; 141 teeth/mm at center ($n=1$). Legs similar to *O. wandella*. Dorsum of abdomen reddish brown; 10th tergite without spines or projections. Venter of abdomen generally pale anteriorly, becoming darker posteriorly. Subgenital plate dark. Genital processes asymmetrical and bifurcate (Fig. 312F'). Measurements in Table 31.

HOLOTYPE. ♂, A-62, nr. Millaa Millaa, QLD, 6 ix 1968, ANC.

SONG. Fig. 313. Sequence of long pulses. Songs taped at A-26 and A-275 are uncertainly attributed to this species.

	p/s	kps	°C
A-62	0.62-0.80	4.0-4.3	18
?A-26	1.85	3.3	24
?A-275	1.53	—	19
A-268	ca. 1.0	—	20

HABITAT. Males found singing 1-3 m above ground on twigs of undergrowth in rain forest.

SPECIMENS. Holotype ♂ ANC.

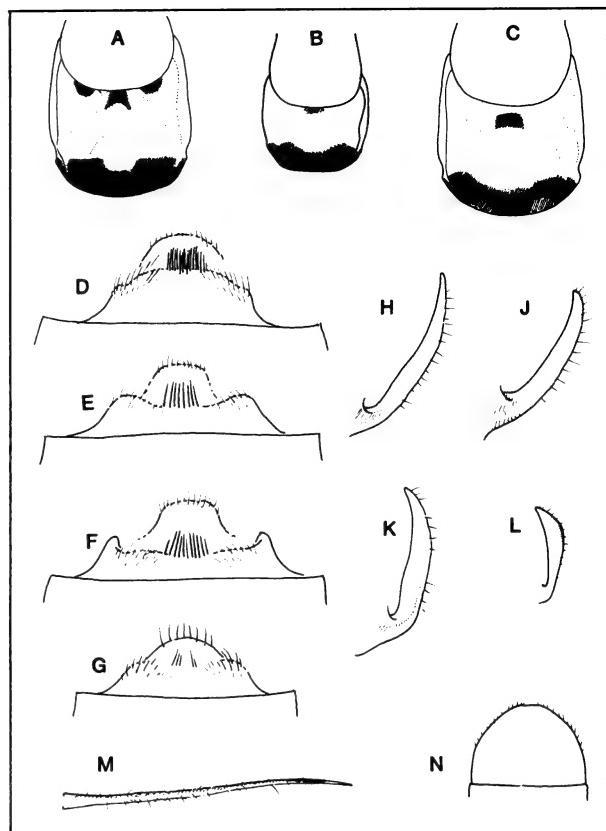


FIG. 319. Abminga Group of *Ornebius*. A, FW's of *abminga*; B, same of *karkalo*; C, same of *woomba*. D-G, 10th tergite: D, *kalara*; E, *coorumbena*; F, *abminga*; G, *karkalo*. H-L, genital processes: H, *kalara*; J, *abminga*; K, *woomba*; L, *karkalo*. M, *coorumbena* cercus; N, *abminga* male subgenital plate.

Ornebius coomialla n. sp., Fig. 312OUH'

RANGE. Central coastal NSW and possibly southeastern QLD.

RECOGNITION. Males: Body color rusty brown. Area between cerci very pale. Head darker than pronotum. Face and basal antennal segments dark brown. Labrum pale dorsally, dark brown ventrally. Dorsum of head just behind transverse suture with dark brown band extending between antennal sockets. Side of head with dark band behind and below eyes, and dark band along lower margin of cheeks. Maxillary palpi with dark brown outer face in 2nd, 3rd, and 4th segments; 5th segment dark proximally, paler distally. Posterior margin of pronotum with light scales. Posterior margin of FW's (viewed together) with three spots (each FW

has only two dark spots, one at postero-lateral corner and one at center). Posterior portion of mirror along the dividing vein with faint brown markings. Diagonal, medial, and anterior lateral veins pale. Lateral field dark ventrally. File of holotype with 210 teeth, 114 teeth/mm at center. Femora I and II pale with dark brown scales scattered on outer face. Tibiae I and II banded. Femur III probably had dark scales arranged in rows on external surface (most scales now apparently lost). Tibia III banded. Dorsum of abdomen dark reddish brown. Area between cerci pale, almost white; 10th tergite pale centrally, but with dark triangular area at inner base of each cercus. Each dorsal abdominal segment darkest along its lateral edge. Genital processes very pale, quite straight (Fig. 312O).

A second male from A-350 has many more dark scales scattered on outer face of femur III. These are arranged in thin horizontal lines. Dorsolateral surface of pronotum also possesses many dark scales. Body measurements in Table 31.

HOLOTYPE. ♂, A-350, 7 miles S of Macquarie River, NSW, 29 xii 1968, ANC.

SONG. Fig. 314. Pairs of pulses followed by single pulses. Song taped at A-526 may not belong to this species.

	p/s				
	A	B	ch/s	kps	°C
A-350	7.7	3.2	1.25	5.0	20
?A-526	6.9	2.7	—	5.0	19

HABITAT. Males sang in vines and tangles in scrub near Macquarie River, NSW.

SPECIMENS. Holotype ♂ ANC. A-350 1♂ ANC.

Ornebius allambi n. sp., Fig. 312SC'

RANGE. Forests of northcentral coastal QLD.

RECOGNITION. Males: Body color brown; FW's with milky white areas and with three dark spots at posterior end. Dorsum of head with dense covering of scales. Labrum dark brown to black. Antennal scape dark brown. Pronotal disk with dense mat of brown scales; posterior margin with both darker and lighter scales. FW similar to *O. wandella*; posterior margin with three dark spots (each FW with three spots); pale gaps between dark spots somewhat milky in color. Lateral field of FW dark ven-

trally. File with 221 teeth, 107 teeth/mm near center. All femora with dense patches of dark scales; in femur III these arranged in narrow bands. Tibiae light brown, indistinctly banded. Dorsum of abdomen with minute black spots (rings). Basal tergites up to 7th with four spots; 8th tergite with two more centrally located spots, 9th tergite with no spots. Tenth tergite with two tufts of setae (Fig. 312C'). Genital processes brownish and darker ventrally. Cerci brownish proximally, turning darker, then lighter, then darker again near tip, tip white. Body measurements in Table 31.

HOLOTYPE. ♂, A-275, near Paluma, Mt. Spec, QLD, 23 x 1968, ANC.

SONG. Fig. 313. Simple sequence of about 5 pulses.

	p/s	kps	°C
A-274	1.5–1.6	4.0	19
A-268	1.8	5.5	20
A-268	1.9	5.5	20
?A-268	2.6	5.5	20
?A-272	2.7	8.0	20

HABITAT. Found in rain forest ca. 5 feet above ground.

SPECIMENS. Holotype ♂ ANC.

Ornebius curtipalpis Chopard, Figs. 310A, 312ELA'

Ornebius curtipalpis Chopard 1951: 439. Holotype ♂, Dorriga, QLD (W. Heron) SAM. Type examined.

RANGE. Mountains of northeastern NSW.

RECOGNITION. Males: Body color yellow-brown. Eyes surrounded by distinctly darker scales. Fifth segment of maxillary palpi with dark proximal area; 3rd and 4th segments mostly dark brown. Posterior margin of FW's (viewed together) with continuous dark band, but each FW dark only from postero-lateral corner to center. Posterior part of mirror with several dark markings. Posterior mirror vein dark. Membrane dark where dividing vein joins posterior mirror vein. Diagonal vein and medial mirror veins dark where they join. Anterior corner of mirror and angle formed by medial and diagonal veins each with a dark mark. Lateral vertical surface largely dark, pale dorsally. File with 182 teeth; 97.5 teeth/mm at center. Femora I and II almost white with dark scales scattered at distal end. Tib-

iae I and II with two indistinct bands, distal one darker. Femur III very pale with dark brown scales scattered on upper and on outer face. Tibia III darker than femur. Dorsum of abdomen light brown, becoming darker distally. Tenth tergite with two spinelike central projections separated by a distance equalling their length. Genital processes light brown and pointed; lower, outer base dark brown, becoming lighter distally (Fig. 312L). Cerci greyish brown, becoming darker near the tip; but tip itself white. Measurements of example male in Table 31.

SONG. Fig. 314. Very ventriloquistic. Consisting of 3-pulse units with first two pulses more closely spaced than last two.

	p/s				
	A	B	ch/s	kps	°C
A-545	15.0	12.5	2	5.4	19.5

HABITAT. Males sang near head height in dead vegetation at edge of small patch of rain forest.

SPECIMENS. Holotype ♂ SAM. A-545 4♂ ANC.

Ornebius kanya n. sp., Fig. 312FQWJ'

RANGE. Type locality in southcentral coastal QLD, Rockhampton region.

RECOGNITION. Males: Body color reddish brown. Dorsum of head yellow-orange with several dark markings just behind transverse suture. Back of head with several indistinct longitudinal lines. Longitudinal suture dividing rostrum black. Side of rostrum black, front of rostrum largely pale. Dorsum of antennal scape darker than venter and darker than dorsum of head. Maxillary palpi: 3rd, 4th, and 5th segments with brown marks on outer face; in 5th segment brown coloration concentrated in proximal half; distal half largely pale. Side of head with dark scales, arranged in horizontal rows between lower edge of eyes and pronotum, and with a dark mark along lower margin. Each anterior quarter of pronotal disk with two small dark spots. Lateral lobes dark brown. Posterior margin with brown scales centrally, and lighter scales laterally. FW marked as in Fig. 312F; posterior margin with three dark spots; lateral field dark ventrally, pale dorsally. File with 143 teeth; 100 teeth/mm at center. Femora I and II with very pale background and with dark scales scattered on upper and outer faces. Tib-

iae I and II banded, proximal band indistinct, consisting of a small darkened area, central band broader and more distinct, distal band darkest. Femur III with brown scales on top outer face arranged into faint rows. Dorsum of abdomen dark brown, darker than pronotum, with 4 spots on each exposed tergite except 9th and 10th; 10th tergite as in Fig. 312J'. Genital processes very slender, dark brown to black at base, curving outwards distally. Cerci light brown, with scattered darker scales; extreme tip white. Measurements in Table 31.

HOLOTYPE. ♂, A-298, nr. Rockhampton, QLD, 6 xi 1968, ANC.

SONG. Fig. 313. Train of 15–25 pulses. Intervals between groups ca. 20 s. One song began with single pulse isolated by about double interval from others.

	p/s	kps	°C
A-298	5.3–5.5	5.7–6.2	18

HABITAT. Forest.

SPECIMENS. Holotype ♂ ANC.

Ornebius aperta n. sp., Fig. 312BPE'

RANGE. Extreme southeastern QLD.

RECOGNITION. Males: Body color rusty brown. Head darker than pronotum. Face dark below eyes and below frons. Mandible, pleurostoma, and side of face darker than dorsum of head. Maxillary palpi brown; length of 5th segment 1.92 times its width and 1.37 times length of 4th segment. Pronotum rusty brown with white scales at posterior margin of disk. Posterior margin of FW completely darkened; but dark band does not include posterior mirror vein, which is also dark. Medial mirror vein dark, especially along its lateral margins. Mirror veins dark where they join. File with 166 teeth; 88.7 teeth/mm at center. Femur I reddish brown on outer and upper surfaces; darker scales arranged into 3 or 4 somewhat indistinct bands. Scales of femur II darker than in femur I and arranged into a fairly distinct band located in distal half, but not reaching distal end. Tibiae I and II darker than femora and indistinctly banded. Femur III with light brown scales over outer surface, but upper face near proximal end with narrow band of dark scales; femur becoming reddish and darker distally. Tibia III

darker than femur; with a very dark band (twice diameter of the tibia in length) at proximal end, and also darker near distal end between serrations. Dorsum of abdomen about same color as pronotum, becoming darker posteriorly; 10th tergite as in Fig. 312E'. Venter of abdomen approximately same color as dorsum, each segment with transverse row of small dark brown spots. Genital processes club-shaped, black at base but light brown distally. Cerci reddish-brown, slightly darker proximally, broken before middle. Measurements in Table 31.

HOLOTYPE. ♂, A-539, Mt. Tambourine, QLD, 25 ii 1969, ANC.

SONG. Not taped, but consists of 3 pulse units—a double pulse followed by a single pulse. Song taped nearby at A-540 (Fig. 314) may belong to this species.

	p/s				
	A	B	ch/s	kps	°C
A-540	14.3	4.8	1.8	5.6	21

HABITAT. Tangles of vines and underbrush in rain forests.

SPECIMENS. Holotype ♂ ANC. A-539 1♂ 1♀ ANC.

Ornebius immarna n. sp., Fig. 312XG'

RANGE. Type locality in vicinity of Ingham, northcentral coastal QLD.

RECOGNITION. Males: Body color tan. Genital processes asymmetrical (Fig. 312G'). Head without dark markings. Pronotum more or less unicolorous. Posterior margin of folded FW with three dark marks; each FW with three dark areas but posterior lateral corner darkest, and partially separated from central area by indistinct light gap. Dark mark at posterior medial corner separated from central dark area by distinct lighter gap. Lateral field of FW largely pale. File with 280 teeth; 136.4 teeth/mm. Dorsum of abdomen pinkish; 10th tergite asymmetrical and with black posterior margin. Venter of abdomen pale. Cerci pale, broken. Measurements in Table 31.

HOLOTYPE. ♂, A-64, Bridge Creek, 18 miles north of Ingham, QLD, 6 ix 1968, ANC.

SONG. Fig. 314. Groups of 2-pulse chirps.

	p/s	ch/s	kps	°C
A-64	1.8	0.7	5.1	23

HABITAT. Collected male was singing at night alone in top of 40-foot eucalyptus tree in open eucalypt forest. Specimen was collected by felling tree and waiting for male to sing again.

SPECIMENS. Holotype ♂ ANC.

Ornebius gumbalera n. sp., Fig. 312MD'

RANGE. Type locality in Derby area, WA.

RECOGNITION. Males: Head and pronotum yellowish or tan. FW's with milky lateral and posterior areas, but with dark posterior band and dark band near pronotum. Abdomen brown. Dorsum of head largely pale, with very light brown or gold scales. Face largely pale but with two faint dark lines on frons. Pronotal scales mostly removed, but those remaining are very light brown. Posterior margin of FW with dark band (FW's in folded position); band does not include posterior mirror vein. In each FW dark band most prominent at posterior lateral corner, becomes narrower and less distinct medially, and does not reach posterior medial corner. Margins of FW's somewhat opaque and milky. Vertical field of FW dark ventrally. File with 249 teeth. Femora I and II pale, with very light brown or yellowish scales. Tibiae I and II darker than femora, very indistinctly banded. Femur III very pale, with small light brown scales, and with light brown band on top of narrowest portion. Tibia and tarsus III largely pale. Dorsum of abdomen brown to dark brown; 10th tergite (Fig. 312D') about as dark as preceding segments and darkest near lateral margins; posterior margin nearly black centrally. Venter of abdomen pale brown; subgenital plate becoming about as dark as tergum. Genital processes dark brown, nearly black. Cerci broken off, but pale proximally. Measurements in Table 31.

HOLOTYPE. ♂, A-774, Derby, WA, 14 v 1969, ANC.

SONG. Fig. 314. 2-pulse chirps.

	p/s	ch/s	kps	°C
A-774 n=3	5.0–5.7	1.3–1.6	5.1–6.2	25

HABITAT. Low shrub vegetation.

SPECIMENS. Holotype ♂ ANC.

ILLAROO GROUP

These are medium to large species, varying in body length from 5.8 to 9.3 mm. Body color straw

yellow to rusty brown. Femora and tibiae strongly banded and tegmina possess 3 dark marks along posterior margin and are somewhat speckled anteriorly (with the exception of *O. yarandilla*). Faces of most species have contrasting dark markings, and most species possess fewer than 200 file teeth. Genital processes pointed and light brown in color. 10th tergite of the abdomen possesses, in most species, 2 tufts of setae centrally. These species quite similar to those in Wandella Group but differ from them in the stronger leg banding and contrasting facial coloration. Most species are from coastal NSW and QLD (with one species collected near Kingston, SA).

O. lika, *O. jatalinga*, and *O. attunga* appear somewhat intermediate between Wandella Group and Illaroo Group. They belong in latter, but are included in key to former.

KEY TO MALES OF ILLAROO GROUP

1. FW's largely dark (Fig. 316G) *yarandilla*
FW's with dark marks near posterior margin, but otherwise light brown or transparent 2
2. Exposed FW length distinctly shorter than exposed abdomen length. Rostral width at least 2 times width of antennal scape 3
Exposed FW nearly as long as exposed abdomen. Rostral width less than 1.9 times width of antennal scape 6
3. Body color dark brown. Head and pronotum with dense covering of dark scales. File with ca. 137 teeth *antakira*
Body color brown to light brown. Head and pronotum without dense covering of scales 4
4. Pronotum distinctly darker along dorso-lateral margins. Cerci shorter than femur III 5
Pronotum not as above. Cerci at least as long as femur III 11
5. Maxillary palpi brown. FW as in Fig. 316C. File with 257 teeth *baloois*
Maxillary palpi light brown or pale and with a dark spot on segments 3 and 4 and two dark spots on segment 5. FW as above. File with 57–63 teeth *illaroo*
6. 10th tergite of abdomen without two tufts of setae near center. Length of 5th segment of maxillary palpi at least 2 times its width 7
10th tergite of abdomen with two tufts of setae near center. Length of 5th segment of maxillary palpi less than 1.9 times its width 8
7. Distal dark band on tibiae I and II clearly darker than proximal dark band. File with ca. 185 teeth 9
Distal dark band on tibiae I and II no darker than proximal band. File with 130–161 teeth 10
8. FW shorter than pronotum. File with ca. 160 teeth *dandiri*

- FW length equal to or greater than pronotal length. File with ca. 78 teeth *oradala*
9. Face, rostrum, and antennal scape dark brown *kapunda*
Face and rostrum pale with brown markings as in Fig. 316N *likka*
10. Face dark on frons (Fig. 316J) *balumba*
Face pale, with a few dark markings (Fig. 316M) *attunga*
11. Maxillary palpi dark brown. FW marked as in Fig. 316A *jatalinga*
Maxillary palpi light brown with dark marks on each segment 12
12. FW as in Fig. 316F *dirkanala*
FW as in Fig. 316E *jirira*

Ornebius illaroo n. sp., Figs. 316HOTWA', 317ANU

RANGE. Central to southern coastal QLD.

RECOGNITION. Males: This species is most similar to *O. oradala* from west of Mt. Spec, but differs from that species in possessing cerci which are shorter than hind femora, in pronotal patterning and in number of file teeth. Pronotum with patches of brown. Dorsum of head pale but with distinct dark band behind each eye extending to pronotum. Antennal scape dark brown, much darker than areas between eyes. Dark bands on antennae very distinct. Rostrum pale on dorsum and dark brown on frons. Frons dark brown dorsally and on sides. Cheeks mostly pale, but lower edge with dark streak. Maxillary palpi: 3rd and 4th segments with white background and dark brown mark on outer face. Pronotum generally pale but patterned with brown and light areas; dorso-lateral region mostly brown; anterior half of disk, with two brown oval areas, these obscured somewhat by dark scales; anterior edge with black scales concentrated mainly behind eyes; posterior half with central, rounded pale area bordered posteriorly and laterally by dark scales. Lateral lobes mostly pale but lower margin darkly pigmented. Posterior margin of each FW with three dark marks. Posterior mirror vein brown. Posterior region of mirror with irregular row of dark markings running parallel to posterior mirror vein. Anterior medial corner of mirror with dark spot. Innermost chord with granular dark line running along it. Lateral field of FW dark ventrally. File with 51–63 teeth ($n=3$). Femur I with scattered dark scales on upper and outer surfaces, these most concentrated on distal outer face. Femur II similar but more distinctly banded. Femur III with scales less

TABLE 32. Body proportions in the Illaroo Group (abbreviations as in Table 31).

	No. file teeth	BL BW	PL FWL	HW RW	RW RL	RW SW	FWL FWW	ML MW	BL (mm)	FL (mm)	
<i>illaroo</i>	H	51	3.33	1.19	2.36	2.33	2.15	0.83	1.00	7.5	3.7
	P♀	—	3.32	—	2.50	2.15	2.15	—	—	6.9	3.8
<i>attunga</i>	H	168	3.14	1.07	3.00	1.68	1.72	0.93	1.00	9.2	4.2
	P♂	—	3.00	1.47	2.77	2.00	2.00	0.63	0.85	7.5	4.0
<i>jatalinga</i>	H	74	3.22	2.00	2.70	2.25	2.07	0.60	0.92	7.9	4.0
	P♀	—	3.41	—	2.59	2.41	2.07	—	—	7.3	4.3
<i>lilka</i>	H	187	—	1.10	2.80	1.66	1.66	0.90	1.04	8.5	3.8
	P♀	—	3.86	—	2.77	1.92	1.68	—	—	9.3	4.5
<i>balumba</i>	H	139	3.11	1.06	3.02	2.04	1.53	0.97	1.06	8.1	4.4
	P♂	—	3.21	1.20	2.94	2.04	1.64	0.97	1.06	8.8	4.3
<i>oradala</i>	H	78	3.32	0.96	2.76	2.08	1.56	1.01	1.09	7.8	3.8
	P♀	—	3.53	—	3.00	1.85	1.56	—	—	8.3	—
<i>antakira</i>	H	137	3.41	1.48	2.51	2.41	2.23	0.70	0.87	8.3	3.8
	P♂	—	2.87	1.11	2.73	2.00	—	0.90	0.93	7.7	4.6
<i>dandiri</i>	H	160	—	2.68	—	—	—	—	—	—	—
	P♀	—	3.33	—	—	—	—	—	—	—	—
<i>jirira</i>	H	160	—	1.13	2.63	1.69	2.07	0.92	1.00	8.0	3.8
	P♂	—	—	1.06	2.69	1.86	2.16	0.92	1.00	7.7	3.8
<i>baloois</i>	H	257	3.38	1.29	2.44	2.27	2.12	0.84	1.00	8.3	3.8
	P♀	—	3.03	1.13	2.75	2.00	1.75	0.91	1.04	8.6	4.3
<i>yarrandilla</i>	H	185	—	2.76	1.22	2.54	—	1.84	0.78	0.91	5.8
	P♂	—	190	—	1.41	2.52	2.07	—	0.69	0.83	7.0

dark than in femur II and arranged in narrow horizontal bands on upper outer face; lower edge with prominent dark spot about one tibial diameter from distal end. All tibiae with two broad dark bands and narrow proximal band somewhat as in *O. yarandilla* (Fig. 316T). Dorsum of abdomen brownish with scattered lighter and darker scales; 10th tergite pale with two groups of about 4 setae centrally (Fig. 317A). Venter of abdomen pale brown with about 6 small dark spots arranged transversely on each sternite except last two segments. Genital processes pale, but with some brown pigmentation on outer face. Cerci with dark patches of scales causing them to appear slightly banded in distal half.

Males from A-51 and A-4 have 63 and 60 file teeth, respectively, and are very similar to holotype. Measurements in Table 32.

Females: Coloration similar to male. Pronotum with two brown oval markings on disk and dark pigmentation on dorso-lateral surface; anterior margin behind eyes with black scales. Posterior central portion pale. Lower margin of lateral lobes with brown pigmentation. Legs very similar to male. Dorsum of abdomen brown, with four rows

of spots (groups of dark scales), two on either side of median line. Venter of abdomen with series of dark spots as in male. Ovipositor slightly bowed throughout and 2.17 times as long as pronotum (3.1 mm in length).

HOLOTYPE. ♂, A-303, Hervey Bay, QLD, 7 xi 1968, ANC.

SONG. Fig. 313. Pair of multi-pulse chirps delivered about 0.2 seconds apart. Second chirp accelerates a bit in pulse rate. Song of Townsville specimens of much lower pitch than in *O. oradala* (at roughly same temperature) and number of pulses in each chirp differ considerably.

	p/s	chirp interval	p/ch		
			1st part	2nd part	kps
A-4 n=2	60.0	0.20, 0.22 s	22, 25	16, 17	5.4, 5.5
A-51	70.4	0.23	28	14	6.2
A-303	80.0	0.14	35	17	6.5
					24
					18

HABITAT. Low shrubby vegetation behind beach or near ocean.

SPECIMENS. Holotype ♂ ANC. A-4 1♂ ANC. A-51 1♂ ANSP. A-303 1♀ ANC.

***Ornebius attunga* n. sp., Figs. 316M, 317J**

RANGE. Type locality in Bunya Mountains, southeastern QLD.

RECOGNITION. Males: Body color generally tan; posterior edge of FW's with continuous dark band. Dorsum of head mostly light brown, but rostrum nearly white, with dark scales along medial margin of eyes and behind eyes; face at lower front edge of eyes with very pronounced dark marks. Top lateral surface and lateral lobes of pronotum with dark scales, but juncture between these two surfaces pale; dark scales on disk concentrated at anterior lateral corner and caudally where margins of FW's emerge from pronotum. FW's similar to *O. wandella* but posterior margin with continuous dark band (FW's viewed together). Lateral field of FW dark ventrally. File with 168 teeth; 97.5 teeth/mm at center. Femora I and II very pale with dark scales more scattered on femur I and arranged in a band on femur II. Tibiae I and II distinctly banded. Femur III with dark brown scales arranged in longitudinal rows on outer face. Tibia III banded between rows of spines. Dorsum of abdomen light brown, scales becoming darker distally; 10th tergite without central projections (Fig. 317J). Venter of abdomen very pale. Last segment before subgenital plate with two lateral notches along posterior edge. Genital processes dark brown at outer lower edge, becoming wider and pale distally. Measurements in Table 32.

HOLOTYPE. ♂, A-526, Bunya Mts, SE QLD, 23 ii 1969, ANC.

SONG. Fig. 314. 3-pulse units, double-pulse unit followed by single pulse.

p/s					
	A	B	ch/s	kps	°C
A-526	12.5	4.6	1.8	5.2	19.5

HABITAT. A male was collected by roadside in brush in Bunya Mountains, southeast QLD.

SPECIMENS. Holotype ♂ ANC.

***Ornebius jatalinga* n. sp., Figs. 316AUY, 317HSB'**

RANGE. Type locality in mountains of southeastern QLD.

RECOGNITION. Males: Head and pronotum reddish brown; abdomen darker than pronotum; tibiae

distinctly banded. Head brownish with very dark brown scales behind eyes. Maxillary palpi brown. Pronotum reddish brown (but most scales appear to have been lost); lateral edge of disk with band of dark scales. Juncture of disk and lateral lobes pale; lateral lobes with band of dark scales. FW's short, front of mirror hidden beneath pronotum; posterior margin mostly dark, but dark band contains several light spots (Fig. 316A); lateral field dark ventrally. File with 74 teeth; 47.7/mm at center. Femora I and II with pale background and with dark scales; scales not arranged in bands. Tibiae I and II distinctly banded; distal band much darker than central and proximal ones. Tibia III with 3 bands, distal band darkest. Dorsum of abdomen brown, darker than pronotum and FW's. Last few segments before cerci quite dark. Tenth tergite dark except for posterior margin which has two lateral processes (one next to inner base of each cercus) and two spine-like central processes separated by about $\frac{3}{4}$ their length. Genital processes light brown; base nearly black. Measurements in Table 32.

Females: Body color paler than male. Posterior lateral corner of pronotal disk with patch of dark scales (most scales may have been rubbed off). Dorsum of abdomen about same color as pronotum, becoming darker caudally. Area between bases of cerci quite pale. Venter of abdomen greyish brown. Membranous area on side of abdomen with series of black spots, one at anterior lateral corner of each sternite. Lower lateral margin of each tergite marked with black. Ovipositor 1.85 times as long as pronotum, quite straight, with black ventral streak in first two thirds; 3.1 mm long.

HOLOTYPE. ♂, A-517, near Cedar Ck, QLD, 22 i 1969, ANC.

SONG. Not taped; consists of single double-pulse chirp followed by 4 or 5 single pulses.

HABITAT. Numerous males were singing in grass and vines along ground by banks of creek below roadside rest stop.

SPECIMENS. Holotype ♂ ANC. A-517 1♂ 1♀ ANC.

***Ornebius lilka* n. sp., Figs. 316NRS, 317COQ**

RANGE. Type locality in extreme southeastern QLD.

RECOGNITION. Males: Body color orange-brown. Dorsum of head yellowish, with brown oval-shaped mark just behind transverse suture. Side of head

with brown streak along lower margin and with brown spots in front of lower portion of eye, on pleurostoma, and on base of mandible. Maxillary palpi brownish, 3rd and 4th segments with dorso-lateral longitudinal dark streak. Pronotum orange, now scaleless, but probably contained irregular patterns of darker brown scales, especially in anterior half. Lateral lobes darker than disk. FW's similar to *O. wandella*; posterior margin with three dark spots—central spot not touching posterior mirror vein. Lateral field dark ventrally. File with 187 teeth. Tibiae I and II distinctly banded; distal band darker than proximal and central ones. Femora I and II pale with brown scales on outer and upper surfaces, forming band near distal end. Distal end of femur III with dark brown marks on lateral and medial surfaces. Anterior tergites of abdomen light brown, 1st 3 tergites distinctly darker. Tenth tergite without tufts of setae; setae scattered. Each sternite with transverse row of 4 small brown spots. Subgenital plate somewhat pointed. Genital processes as in Fig. 317C. Measurements in Table 32.

Females: Body color as in male. Face marked as in male. Dorsum of head with reddish scales concentrated behind antennal sockets, behind transverse suture, on back of head, and behind eyes. Lateral lobes of pronotum with dark brown scales. Legs marked as in male. Dorsum of abdomen slightly lighter than thorax anteriorly, becoming darker posteriorly. Venter of abdomen without dark spots as in male. Subgenital plate pale, posterior margin slightly indented (Fig. 317O). Ovipositor slightly bowed throughout. Ovipositor length 3.6 mm, 2.04 times as long as pronotum.

HOLOTYPE. ♂, A-537, nr. Esk, QLD, 23 ii 1969, ANC.

SONG. 2-pulse chirps followed by single pulse; not taped.

HABITAT. Low trees by roadside.

SPECIMENS. Holotype ♂ ANC. A-537 1♀ ANC.

Ornebius balumba n. sp., Figs. 310B, 316DJLVX, 317MPRA'

RANGE. Northern coastal QLD.

RECOGNITION. Males: Body pale yellow-brown. FW's with three dark spots at posterior edge. Dorsum of abdomen slightly darker than pronotum. Cerci slightly banded. Legs very distinctly banded.

Rostrum very dark on front and sides, pale on top. Side of head with dark scales behind eyes.

Anterior margin of pronotal disk with black scales. (Scales on pronotum may have been largely lost.) Posterior margin with light scales. Posterior margin of FW's (seen together) with three dark spots (Fig. 316D), but each tegmen has only two spots, one central and one at posterior lateral corner; light areas along posterior margin milky. Junction of dividing vein and posterior mirror vein dark. Diagonal vein, medial mirror vein, and anterior mirror vein dark where they join. Anterior corner of mirror with small dark spot and posterior region of mirror with several dark lines. Narrow dark line running parallel to anterior lateral vein. Region of chords with granular dark markings. File with 139 teeth; 89/mm at center. Femur I with dark scales concentrated mainly near distal end, but not forming dense dark band. Femur II with scales concentrated in very distinct dark band in distal half. Tibiae I and II distinctly banded; proximal band darker than distal band. Outer face of femur III with distinct longitudinal dark bands (most scales missing). Tibia III banded between serrations. Dorsum of abdomen brownish; 9th tergite with black scales in front of cerci; 10th tergite (Fig. 317M) almost white. Venter of abdomen pale but with series of dark spots along lateral membranous area. Genital processes almost white. Cerci with gray scales arranged in somewhat indistinct bands. Measurements in Table 32.

Females: Body color similar to male. Head similar to male. Pronotum with dark scales along front margin (most pronotal scales appear to be rubbed off). Legs similar to male. Abdomen generally light brown, becoming paler caudally. Venter of abdomen very pale with slightly notched subgenital plate. Cercus pale with dark gray scales, and somewhat banded in distal half. Ovipositor straight, 3.6 mm in length, distal end as in Fig. 316X; 2.26 times as long as pronotum.

HOLOTYPE. ♂, A-20, Herbert River, QLD, 31 vii 1968, ANC.

VARIATION. A male from A-20 has 149 file teeth; posterior-medial dark spot on FW much less distinct than other two; anterior, dorso-lateral corner of pronotum (regions behind eyes) with distinct patch of black scales; scales more medial and posterior to this area lighter; cerci more distinctly

banded distally than in type. A male from A-36 has 161 teeth and a male from A-29 has 130 teeth.

SONG. Fig. 314. Alternation of single pulses and short trills containing 9–11 pulses. Whole phrase cycles 2 or 3 times each 10 s, single pulses and trills evenly spaced, about 2 s apart either way. A male north of Ingham seemed to start a trill when there should have been a single pulse and gave only 2 pulses at the fast rate, then 3 at a rate of 4.8/s, then a trill after another 2 s interval. A Cooktown male occasionally produced 2 or 3 pulses where the single pulse should go.

	p/s	p/ch	kps	°C
A-20	18.0–18.5	10–11	5.1–5.7	21
A-36	20.0	8	5.5–5.7	23
?A-44	25.0	—	6.0	21

HABITAT. Sings at night from trunks, low branches, and foliage of bushes and small trees, 4–8 feet above ground.

SPECIMENS. Holotype ♂ ANC. A-20 1♂ 2♀ ANC. A-29 1♂ ANSP. A-36 1♂ ANC.

Ornebius oradala n. sp., Figs. 316P, 317DTY

RANGE. Northcentral coastal forests of QLD.

RECOGNITION. Males: General body color yellow-brown. Similar to *O. illaroo*. Back of head with 6 longitudinal dark bands, the two lateral ones situated behind eyes; these extend anteriorly to about middle of eyes. Rostrum dark on three vertical surfaces. Labrum with dark brown margins. Lower edge of cheeks bordered by dark band. Pronotum about same color as head. Dorso-lateral margin with row of black scales. Posterior margin with dark scales, mainly near middle. Posterior margin of FW with three dark spots, two at each corner and one centrally; on each FW central and postero-lateral dark marks more distinct; posterior medial spot very indistinct; posterior mirror vein largely dark; membrane around junction of posterior mirror vein and dividing vein dark. Medial mirror vein, anterior mirror vein, and diagonal vein dark, including membrane on either side of them. File with 78 teeth; 60.8 teeth/mm at center. Femur I with dark scales on dorsal and outer face, more concentrated distally, but not arranged in distinct band. Femur II with scales arranged in distinct dark band near distal

end. Tibiae I, II and III with 3 distinct dark bands, proximal band being quite narrow. Femur III with dark spot at lower edge and near distal end. Dorsum of abdomen reddish brown, with definite dark spots arranged in 4 rows, lateral rows less distinct; 10th tergite generally pale, without distinct lateral projections and with two groups of setae near center (Fig. 317D). Sternum lighter than tergum. Genital processes pale yellow (Fig. 317Y). Cerci with scattered dark scales arranged in faint bands in distal half. Measurements in Table 32.

HOLOTYPE. ♂, A-272, nr. Paluma, QLD, 23 x 1968, ANC.

SONG. Fig. 313. Pair of chirps (or short trills), first longer than second. Chirp pairs produced about once every minute.

	p/s	p/ch		kps	°C
		1st part	2nd part		
A-272	41.0	43	7	4.4	17
A-492	33.5	40	7	5.7	22

HABITAT. This male was found near ground among some very small trees in open eucalypt woodland.

SPECIMENS. Holotype ♂ ANC.

LISTENING RECORDS. A-274, A-280.

Ornebius antakira n. sp., Figs. 316B, 317EV

RANGE. Type locality in extreme southern SA.

RECOGNITION. Males: Body dark brown; somewhat speckled in appearance. Legs markedly banded. FW's also with three terminal dark spots. Dorsum of head with dark brown scales arranged into 6 bands on back of head, with broad band behind and below each eye; median line with narrow pale line which branches in middle of head to form Y-shaped mark. Dorsum of head generally dark brown. Scape and 2nd antennal segment dark brown. Frons dark brown along sides and on dorsal central surface. Side and front of face largely speckled. Maxillary palpi mostly dark brown, but distal and proximal end of each segment pale; 5th segment dark proximally. Labial palpi with brown spots on outer face of each segment. Lateral lobes of pronotum black; with 4 small dark spots 2 in each anterior quarter. Posterior margin with both light and dark scales. Posterior margin of FW's with three dark

spots (Fig. 316B), one at each corner and one centrally; posterior lateral spot darkest. Posterior mirror vein dark. Front of mirror largely hidden. Lateral field nearly black. File with 137 teeth; 100.3 teeth/mm. Femur I with pale background and with black scales concentrated in distal half. Tibiae I and II with distinct black bands; proximal band narrow, central and distal bands approximately equal in width and darkness. Femur III with dark brown scales on top and outer faces; in dorsal anterior half these arranged in narrow horizontal bands. Distal end of femur dark brown. Tibia III with small dark spot distally, central black band about twice tibial diameter, and distal dark band a little more than one tibial diameter in length. Dorsum of abdomen dark brown, with 4 rows of black spots; 10th tergite pale, with two spinelike central projections (Fig. 317E) separated by about their basal diameter. Venter of abdomen largely dark brown but somewhat speckled. Subgenital plate dark brown. Genital processes nearly white distally, becoming brown basally. Cerci shorter than femora III and speckled but not distinctly banded. Measurements in Table 32.

HOLOTYPE. ♂, A-362, nr. Kingston, SA, 7 i 1969, ANC.

SONG. Fig. 313. Succession of trills each with 12–16 pulses.

	p/s	kps	°C
A-362	4.3	5.5	23

HABITAT. Found in numbers, singing at night near ground under bushes behind beach.

SPECIMENS. Holotype ♂ ANC. A-362 1♂ 2♀ ANC.

Ornebius dandiri n. sp., Fig. 317KD'

RANGE. Type locality in central coastal NSW.

RECOGNITION. Males: Body color now brownish. Legs banded. Face without distinct markings of *O. antakira*. Top of frons pale. Dividing suture of rostrum black. Maxillary palpi brown, length of 5th segment 1.83 times its width and 1.29 times length of 4th segment. Lateral lobes of pronotum dark brown, nearly black; dorsal surface lighter. Posterior margin of FW with three dark spots—spot at posterior medial corner very indistinct. Region surrounding junction of diagonal vein, anterior lateral,

and medial mirror veins largely darkened. Anterior portion of FW including anterior portion of mirror brown. Posterior mirror vein largely dark. Membrane surrounding junction of dividing vein and posterior mirror vein dark. Lateral field dark brown ventrally, pale dorsally. File with 160 teeth; 104 teeth/mm. Femora and tibiae marked as in *O. antakira*. Tarsi I and II; 1st segment with dark proximal and distal bands. Tibia III with 3 bands—proximal band distinct and about 1.5 times tibial diameter, central band fading gradually distally, distal band fading gradually proximally. Dorsum of abdomen dark brown with two spine-shaped projections on the 10th tergite (Fig. 317K). Venter of abdomen somewhat lighter than dorsum. Genital processes brownish, slightly darker at tips and dark brown at base. Cerci unbanded and with small patches of dark scales. Measurements in Table 32.

Females: Head colored as in male, pronotum darkest along lower margin of lateral lobes. Legs marked as in male. Dorsum of abdomen brown, darker than pronotum. Ovipositor 4.1 mm long, bowed at the base but straight through most of its length; 2.22 times as long as pronotum. Cerci with scattered dark scales.

HOLOTYPE. ♂, A-581, nr. Newcastle, NSW, 26 ii 1969, ANC.

SONG. Group of single pulses; not taped.

HABITAT. Found by roadside at edge of mangroves.

SPECIMENS. Holotype ♂ ANC. A-581 1♀ ANC.

Ornebius jirira n. sp., Figs. 316E, 317GZ

RANGE. Type locality in forests of southeastern QLD.

RECOGNITION. Males: Slender, reddish brown species with mottled FW's and banded tibiae. Dorsum of head with dark scales behind antennal sockets and behind transverse suture. Side and front of head quite dark, labrum pale. Side of head with distinct horizontal band extending from lower back side of eye backwards to pronotum and separated from a lower dark band by a narrow light band. Antennal scape dark above and pale beneath. Maxillary palpi with dark marks on outer surface of each segment, otherwise pale. Fifth segment dark in proximal half. Pronotal disk orange; dorso-lateral surface and anterior margin with black scales. FW's

short; posterior margin with three dark spots, one at each corner and one centrally (Fig. 316E). File with 160 teeth. Femur I with dark brown scales on top and outer faces. Femur II similar to femur I but scales more concentrated distally; distal end pale in both femora. Femur III appears to have had black scales on proximal dorsal ridge and on external surface (most scales now removed); lower edge of femur with black spot about 1.5 tibial diameters from distal end. Tibiae I and II with short proximal dark band, and broader central and distal bands equal in intensity and length. Tibia III: central dark band about twice as broad as distal band. Dorsum of abdomen brown, and mostly lighter than pronotum; however, 9th tergite with dark scales; 10th tergite brown with pale central area and two central spine-like projections separated from one another by a distance slightly greater than their length (Fig. 317G). Venter of abdomen pale with 4 faint dark spots on each segment except last two. Subgenital plate dark brown. Genital processes pale brown, becoming nearly black at base. Cerci distinctly banded with black scales, especially in distal half. Measurements in Table 32.

HOLOTYPE. ♂, A-517, Cedar Creek Gorge, 17 miles north of Monto, QLD, 22 ii 1969, ANC.

SONG. Fig. 313. Train of pulses.

	p/s	kps	°C
A-517	4.25	6.5	24

HABITAT. Two males collected on trunk of large tree, in forested gully.

SPECIMENS. Holotype ♂ ANC. A-517 1♂ ANC.

Ornebius baloois n. sp., Fig. 316C

RANGE. Type locality in central coastal QLD.

RECOGNITION. Males: Head and pronotum largely covered with dark brown scales. FW's with dark posterior band and with several dark marks near pronotum. Dorsum of abdomen dark brown. Legs very distinctly banded with black scales. Genital processes very pale. Face with two very distinct systems of black lines. Antennal scape with black along medial and lateral edges. Dorsum of head with dark scales arranged in two broad longitudinal bands between eyes, and a broad dark band behind each eye. Side of head with dark streak along the

lower edge of cheeks. Maxillary palpi largely black. Pronotum with pale yellow background but with very dark scales along dorsal, antero-lateral field. Junction of lateral lobes and pronotal disk pale; bottom edge of lateral lobes with dark band. Posterior margin of FW with dark transverse band interrupted by two pale spots along posterior edge (one on each side of median line). Front of FW with several dark spots; a large dark mark inside anterior corner of mirror, another medial to juncture of diagonal vein and mirror, and narrow curved line running parallel to anterior mirror vein. Lateral field of FW dark ventrally, pale dorsally. File with 257 teeth. Femora I and II with pale background and with black scales concentrated along outer faces. Tibia I and II very distinctly banded with black scales, with two main dark bands, one in proximal half and one in distal half. Coxae I and II with dark markings. Thorax above coxa II with a dark mark. Femur III with black longitudinal stripes, particularly distinct at anterior lateral portion of femur. Tibia III, pale between spines but with two broad dark bands on inside of tibia, one in distal half and one in proximal half. Dorsum of abdomen dark reddish-brown with 4 black spots on each tergite, except last three. Area between cerci almost white; area in front of cerci dark; 10th tergite with two lateral projections, one next to interior base of each cercus. Sternum dark brown; subgenital plate very dark brown proximally and lighter in distal third, posterior margin rounded, nearly semicircular. Genital processes very pale. Cerci pale brown, becoming slightly darker caudally, last quarter pale again. Measurements in Table 32.

HOLOTYPE. ♂, A-17, Burdekin River, QLD, 29 vii 1968, ANC.

SONG. Fig. 313. Groups of pulses, with 4–12 p/group.

	p/s	kps	°C
A-17	1.8	4.3	20

HABITAT. Found in brush along rivers.

SPECIMENS. Holotype ♂ ANC.

Ornebius kapunda n. sp., Fig. 317FX

RANGE. Southcentral to southern coastal QLD.

RECOGNITION. Males: Body reddish brown with

dark brown face. Abdomen darker than pronotum. Rostrum, face and scape dark brown, much darker than area behind rostrum. Frons with inverted Y-shaped light area ventrally. Side of head with dark brown scales behind eyes. Maxillary palpi: each segment with brown stripe on outer face; 5th segment lighter centrally, darkest proximally and distally. Pronotal disk reddish; darkest along anterior margin behind eyes. Most scales rubbed off. Posterior margin of FW with three main dark areas, posterior lateral corner darkest; these dark marks extend from edge about half way to posterior mirror vein. Posterior mirror vein dark. Anterior lateral mirror vein dark where it joins diagonal vein. Lateral field mostly dark brown. File with 185 teeth. Femora I and II largely covered with dark scales on outer faces. Tibiae I and II distinctly banded, distal band distinctly darker than proximal band. Distal dark band interrupted on top by light gap; 3rd segment with small dark area at proximal end, pale centrally, dark in distal half. Femur III covered with brown scales which are not as dark as those of femora I and II. Tibia III banded, distal band darkest. Dorsum of abdomen darker than pronotum, becoming dark brown distally; each tergite with dark lateral margin. 10th tergite largely pale, much lighter than preceding tergites, and without central groups of setae. Sternum dark, becoming very dark on subgenital plate. Genital processes very slender, cylindrical, pale. Measurements in Table 32.

HOLOTYPE. ♂, A-298, nr. Rockhampton, QLD, 6 xi 1968, ANC.

SONG. Fig. 314. Group of double-pulse chirps and single pulses in patterns. Following is typical alteration at Yeppoon Junction (2, 2, 2, 2, 1, 2, 2, 2, 2, 1, 2, 2, 2, 1, 1, 2, 2, 2, 1, 1, 2, 2, 2, 1, 1, 2). The Susan River male was an alternately single-pulse and double-pulse singer that sometimes omitted the single pulse, but retained the interval between successive 2-pulse chirps as if the single pulse were there.

	p/s (shortest interval)	kps	°C
A-298	14.3	6.0	18
A-301	14.3-15.4	5.6-6.0	24

HABITAT. Forest undergrowth and forest margin.

SPECIMENS. Holotype ♂ ANC.

***Ornebius yarandilla* n. sp., Figs. 316GKZ, 317BC'**

RANGE. Central and perhaps northern coastal QLD.

RECOGNITION. Males: Small, brown species. FW largely dark brown (Fig. 316G). Face dark brown, labrum nearly black (Fig. 316K). Dorsum of head and cheeks lighter brown. Membrane in antennal sockets dark brown with central pale spot (dorsal view). Maxillary palpi as in Fig. 316Z. Pronotal disk reddish-brown (scales mostly removed); posterior edge with white scales; lateral lobes dark brown. FW's dark brown, except for two milky white areas along posterior margin (Fig. 316G). Legs I and II strongly banded. Dorsum of abdomen about same color as pronotum; 10th tergite with two spine-shaped projections (Fig. 317B). Genital processes pale brown (Fig. 317C'). Cerci banded with light and dark scales (ca. 5 darker bands). Measurements in Table 32.

HOLOTYPE. ♂, A-16, Townsville, QLD, 16 viii 1968, ANC.

SONG. Trills with 13-18 p/tr. Trills delivered at 10-15 s intervals.

	p/s	p/ch	kps	°C
A-16	4.3	6	6.0	18
A-41 n=2	4.1-4.2	7-9	6.4-6.5	21
A-496	5.3	—	6.5	26

HABITAT. Brushy areas along rivers and near sea-coast.

SPECIMENS. Holotype ♂ ANC. A-16 1♀ ANC.

***Ornebius dirkanala* n. sp., Figs. 316FQ, 317L**

RANGE. Type locality in extreme northern NT.

RECOGNITION. Males: Body color yellowish. Legs distinctly banded. Abdomen slightly darker than pronotum and head. Head with dark scales behind eyes. Antennal sockets bordered with dark margin dorsally and ventrally. Face with two prominent dark spots below anterior ventral margin of eyes and with a dark line along ventral margin of cheeks. Maxillary palpi: segments 3, 4, and 5 each with a dark ring. File with 190 teeth. FW's with broad band along posterior margin which extends into mirror; lateral field FW darkly pigmented ventrally. Legs banded; tibiae I and II with 3 dark bands, 2 in proximal half and one in distal half. Basal tarsal segments with proximal and distal dark

band. Tenth tergite of abdomen as in Fig. 317L. Measurements in Table 32.

HOLOTYPE. ♂, A-144, East Alligator River, NT, 27 ix 1968, ANC.

SONG. Fig. 314. Complex chirps which begin with 2- or 3-pulse unit followed by single pulse. Chirps at 6/10 s in groups of 2 or 3 chirps separated by 4 s intervals.

	p/s				
	A	B	ch/s	kps	°C
A-144	33.3	3.7	—	9.0	26
A-144	30.3	4.3	0.6	9.2	26

HABITAT. Found in leaf litter accumulating in rock cracks in rocky outcrop.

SPECIMENS. Holotype ♂ ANC.

ABMINGA GROUP

The six species belonging to the Abminga Group occur in forests of coastal Queensland. They can be distinguished from species in the Wandella and Ilalaroo groups by the following characteristics: Distal end of abdomen distinctly darker than pronotum. FW's appear less mottled than in previous two groups and possess a continuous dark band along posterior margin, and anterior field frequently possesses 1 or 3 dark spots (both FW's viewed together). Lateral field of FW's usually without dark pigmentation (except in *O. karkalo* and *O. kalara*). All species possess a stridulatory file with more than 280 file teeth. Legs indistinctly banded, and 10th tergite of abdomen without two tufts of setae. Genital processes pale or brownish. *O. karkalo* and *O. kalara* somewhat intermediate between the Abminga and Wandella groups.

KEY TO MALES OF ABMINGA GROUP

A. Northern QLD (Townsville to Cairns)

- Lateral field of FW dark ventrally. Body length less than 8.0 mm 2
- Lateral field of FW entirely pale or transparent. Body length more than 8.0 mm 3
- FW with a single central dark spot near pronotum (Fig. 319B). Body length less than 7.0 mm. Genital processes as in Fig. 319L. 10th tergite of abdomen as in Fig. 319G *karkalo*
- FW with 3 dark spots near pronotum. Body length more

than 7.5 mm. Genital processes as in Fig. 319H. 10th tergite of abdomen as in Fig. 319D *kalara*

- File with about 291 teeth and with 147 teeth/mm at center *woomba*
- File with about 294–345 teeth and with more than 160 teeth/mm at center of file 4
- File with 328–345 teeth and 180–184 teeth/mm at center of file *abminga*
- File with 295–326 teeth and with 167–173 teeth/mm at center of file *coorumbena*

B. Southeastern QLD

- (see Recognition) *nigromaculatus*

Ornebius abminga n. sp., Figs. 310C, 319AFJN

RANGE. Tully region of northern QLD.

RECOGNITION. Males: Body yellow to brown; pronotum darker than head; abdomen brownish, darker than pronotum. Face more or less uniformly yellowish but with darker marks above epistomal suture and in front of lower corner of eyes, on pleurostoma, and on base of mandible. Pronotum orange with white scales at posterior edge. Posterior margin of FW's with continuous dark band. Front of FW's with three dark spots (FW's seen together); each FW, with only two dark spots, one in anterior corner of mirror and one in angle formed by diagonal vein and medial mirror vein. Some males possess only one dark mark at anterior portion of FW's. Lateral field of FW pale. File with 328–345 teeth (n=3). Legs with pale brown background and light brown scales. Each tergite of abdomen with 4 dark spots (small rings of dark scales). Each sternite with 4 small dark spots. Cerci pale with scattered greyish scales. Genital processes light brown. Measurements in Table 33.

HOLOTYPE. ♂, A-24, Mission Beach, near Tully, QLD, 1 viii 1968, ANC.

SONG. Fig. 313. Groups of 9–12 pulses with slight acceleration of pulse rate during delivery of each group.

	p/s (average)	kps	°C
A-24 n=5	2.7–3.4	5.1–5.5	ca. 21
A-59 n=3	4.3–4.7	5.1	20

HABITAT. Males sing at night, 5–6 feet above ground in bushes and small trees in rain forests.

SPECIMENS. Holotype ♂ ANC. A-24 1♂ ANC. A-59 1♂ ANSP.

TABLE 33. Comparison of body proportions in the Abminga Group (abbreviations as in Table 31) (E, example male).

		No. file teeth	BL BW	PL FWL	HW RW	RW RL	RW SW	FWL FWW	ML MW	BL (mm)	FL (mm)
<i>abminga</i>	H	328–345	2.97	1.33	3.20	2.04	1.41	0.82	0.95	8.4	4.8
	P♂	—	—	—	—	—	—	—	—	8.8	4.7
<i>woomba</i>	H	291	—	1.32	3.35	1.77	1.53	0.87	0.94	9.0	4.8
	P♂	—	—	—	—	—	—	—	—	—	—
<i>coorumbena</i>	H	295–306	2.86	1.23	3.17	2.55	1.53	0.88	0.93	8.3	4.3
	P♂	306	3.18	1.46	3.17	2.27	1.64	0.74	0.88	8.7	4.7
<i>karkalo</i>	H	290	2.84	1.47	2.60	2.30	2.30	0.68	0.90	5.9	3.2
	P♂	—	2.92	1.30	2.52	3.28	2.09	0.74	0.82	6.1	3.2
	P♀	—	3.18	—	2.56	2.08	2.27	—	—	5.8	3.2
<i>kalara</i>	H	194	—	1.38	2.75	2.04	1.89	0.79	0.89	7.8	4.3
<i>nigromaculatus</i> (A-545)	E	?	2.86	1.32	2.95	1.85	1.60	0.84	0.96	7.5	4.0

***Ornebius woomba* n. sp., Fig. 319CK**

RANGE. Innisfail region of northern QLD.

RECOGNITION. Males: Very similar to *O. abminga* and *O. coorumbena*. Head, pronotum, and front part of FW's rusty brown; abdomen considerably darker, greyish brown. Pronotum covered with brown scales. Dorsum of head almost uniformly rusty brown in color. Face lighter, yellowish; with dark marks as in *O. abminga*. Frons with network of faint reddish lines on either side of median line. Scales behind eyes distinctly darker than on top of head. Pronotum yellow to orange and covered with brown scales. Posterior margin with whitish scales. Each anterior quarter with black spot consisting of small ring of black scales. Posterior margin of FW with a black transverse band partially interrupted by two pale spots along posterior edge. Anterior corner of mirror with single dark spot. Lateral field pale. File with 291 teeth spaced at 147 teeth/mm at center. Dorsum of abdomen dark brown with greyish scales, and with 4 longitudinal rows of small black spots (rings of black scales); the two more medial rows more distinct caudally. Venter of abdomen brown, lighter than tergum, darker caudally; each sternite with transverse row of small black spots (4 or more). Genital processes greyish. Measurements in Table 33.

HOLOTYPE. ♂, A-27, The Boulders, near Babinda, QLD, 3 viii 1968, ANC.

SONG. Fig. 314. Groups of chirps containing lone pulse followed by 2 or 3 pulses grouped together. These complex chirps at 3–4/5 s in groups of 3–5; groups delivered every 5 s. Sometimes 3 pulses follow single one.

	p/s		ch/s	kps	°C
	A	B			
A-37	6.3	4.17	1.05	5.7	19.5
A-27	5.3–6.6	3.2–5.5	0.2–0.8	5.4	18
A-33	5.3	3.1	—	4.8	20

HABITAT. Males sang at night from head-high foliage of bushes and small trees in rain forests.

SPECIMENS. Holotype ♂ ANC.

***Ornebius coorumbena* n. sp., Fig. 319EM**

RANGE. Cairns region of northern QLD.

RECOGNITION. Males: Posterior edge of pronotum with brown scales. FW's with 3 anterior dark spots. File with 295, 306 teeth (n=2). Dorsum of abdomen with dark spots as in *O. abminga*. Sternum without distinct dark spots. Tenth tergite of abdomen slightly different from *O. abminga* Fig. 319E. Cerci pale brown proximally, becoming paler distally, with dark brown band in last 1/7th followed by white tip; dark brown band and white bands at tip about equal in length. Genital processes similar to *O. abminga*. Measurements in Table 33.

HOLOTYPE. ♂, A-29, East of Kuranda, QLD, 4 viii 1968, ANC.

SONG. Fig. 314. Heard but not taped; train of 8 or more pulses with intervals becoming shorter and shorter.

	p/s (last part)	kps	°C
A-27	6.3–8.3	5.0–6.4	22
A-26	6.3	4.5	24

HABITAT. Males sang at night 4–8 feet above ground in small bushes and trees in rain forests.

SPECIMENS. Holotype ♂ ANC. A-29 2♂ ANC, 1♂ ANSP.

Ornebius karkalo n. sp., Fig. 319BGL

RANGE. Townsville region of northern QLD.

RECOGNITION. Males: Dorsum of head reddish brown; scales on back of head arranged in faint bands, band behind eyes darkest. Side of head with dark scales, especially along lower margin. Scape slightly darker than head between eyes. Head with two dark spots just posterior to transverse suture. Frons with fine network of brown markings dorsally and on sides. Base of mandible, pleurostoma, and face at lower front edge of eyes with dark marks. Maxillary palpi brown except for proximal and distal ends of each segment. Disk of pronotum yellow-orange; lateral lobes darker; posterior margin of disk with brownish scales. Front of mirror nearly hidden beneath pronotum. Posterior margin of FW with a broad dark band (Fig. 319B); lateral field dark ventrally. Anterior portion of mirror with single brown mark. File with ca. 290 teeth. Femora I and II with brown scales on upper and outer faces and extending to distal end. Tibiae I and II with 3 dark bands, proximal band darkest; central and distal dark bands lighter and equal in width. Femur III with narrow horizontal rows of scales on outer face. Tibia III with distinct proximal band and indistinct central and distal bands. Dorsum of abdomen with 4 dark spots except 9th segment which has only two spots near center; 10th tergite pale (Fig. 319G). Venter of abdomen without dark spots. Genital processes very pale. Cerci very pale. Measurements in Table 33.

Females: Body color similar to male but darker. Head covered with brown scales, facial markings similar to male. Pronotum darkest on lateral lobes and along posterior margin. Legs similar to male. Ovipositor 2.4 mm long, about 1.81 times as long as pronotum.

HOLOTYPE. ♂, A-64, 90 miles north of Townsville, QLD, 6 ix 1968, ANC.

SONG. Fig. 314. Series of two-pulse chirps similar to that of *O. bambara* of the Wandella Group.

	p/s	ch/s	kps	°C
A-64 n=4	4.9–5.7	0.8	6.3–6.8	23

HABITAT. Found in grass and leaf litter in open eucalypt forest and at edge of rain forests.

SPECIMENS. Holotype ♂ ANC. A-24 2♂ 2♀ ANC. A-64 1♀ ANC.

Ornebius kalara n. sp., Fig. 319DH

RANGE. Type locality on Green Island, northern QLD.

RECOGNITION. Males: Head and pronotum yellow-brown; abdomen dark brown. Head yellow-brown with light brown scales. Frons lighter than dorsum of head with dark horizontal line ventrally and on either side. Longitudinal groove of rostrum dark brown. Maxillary palpi light brown. Pronotal disk same color as head. Lateral lobes as light as disk; with 4 light spots in anterior half (2 in each anterior quarter). FW with continuous posterior dark band and 3 dark marks anteriorly. Dark mark just anterior to mirror is elongate and follows anterior mirror vein; lateral field dark ventrally. File with 341 teeth spaced at 194 teeth/mm at center. Femora I and II very pale with scattered light brown scales; tibiae I and II with 3 somewhat indistinct darker bands, distal band darkest. Femur III pale with light brown scales arranged in horizontal bands dorsally. Tibia III with short distal band and then 2 broad reddish bands between serrations. Dorsum of abdomen brown, much darker than pronotum; with indistinct dark spots. 10th tergite as in Fig. 319D. Each sternite with 4 small, very distinct dark spots 2 on either side of center line. Genital processes pale and very slender. Measurements in Table 33.

HOLOTYPE. ♂, A-282, Green Island, QLD, 26 x 1968, ANC.

SONG. Fig. 313. Not positively identified. We believe, however, that a single pulsed song with long pulses belongs to this species. Also the high number of file teeth suggests a song with long pulses.

	p/s	kps	°C
A-282	2.3	7.5–7.8	25

HABITAT. Forest on Green Island.

SPECIMENS. Holotype ♂ ANC.

Ornebius nigromaculatus (Chopard)

Liphoplus nigromaculatus Chopard 1925: 22. Holotype ♂, Mt. Tambourine, QLD, sm. Transferred to *Ornebius* by Chopard (1951). Type examined.

RANGE. Chopard (1951) records this species from Mt. Tambourine, Yarranbah, Bellenden Ker, Brookfield, and Cairns district. Because the ranges of forest Mogoplistinae are small we doubt if specimens far from the type locality belong to this species.

RECOGNITION. We made the following notes on the type: Pronotum all reddish; head darker, but not black; face freckled reddish and blackish; palpi almost black except ends of each segment; legs brownish; hind femur all brown; subgenital plate very dark brown; posterior margin of FW black; FW with black spot near lateral edge of stridulatory vein; cerci pale brown, not mottled; genital processes brown. Chopard gives the following measurements: Body length 8.5 mm; pronotal length 3 mm; FW length 3 mm; femur III length 5 mm.

SONG. Not known.

HABITAT. Probably rain forests.

SPECIMENS. We studied a male and a female from Mt. Tambourine, QLD, and a male from A-545 believed to belong to this species.

LARA n. gen.

TYPE SPECIES: *Lara kalimna* n. sp.

Four of the species, *L. hackeri*, *L. kalimna*, *L. munilla* and *L. nimmitabel*, are from forests of coastal QLD; they are quite similar in tegminal coloration, with darkened lateral and posterior margins and a pale or milky central area. *L. cowandilla* and *L. natarina* are from dry open woodland on the Cape York Peninsula.

RECOGNITION. Species in this genus medium to large in size, yellow in color. Top of abdomen straw-colored through most of its length but becomes black between bases of cerci (Fig. 322D-G). Genital processes light brown in color.

KEY TO LARA MALES

1. Left and right genital processes each with several terminal points 5
- Left and right genital processes each with a single terminal point 2
2. FW's dark around margins, pale centrally. Lateral field of FW's with brown to dark brown pigmentation.
FW's much shorter than exposed abdomen 4
- FW's dark along posterior margin, pale anteriorly and laterally. Lateral field of FW without dark pigmentation 3

3. FW length less than pronotal length. Head width more than 3.5 times rostral width. File with ca. 222 teeth
- cowandilla*
- FW length greater than pronotal length. Head width about 3.0 times rostral width. File with ca. 193 file teeth
- natarina*
4. Face dark brown, tibia dark brown
- hackeri*
- Face and tibia pale or light brown
- kalimna*
5. Genital processes symmetrical, each ending in two points (Fig. 322G)
- munilla*
- Genital processes asymmetrical, each ending in three points
- nimmitabel*

Lara kalimna n. sp., Fig. 322BF

RANGE. Eastern coastal QLD.

RECOGNITION. Males: General body coloration yellowish or tan. Most similar to *L. munilla* but separable by genital processes. FW's dark peripherally, darkest along posterior margin, and with light transparent area inside mirror. Distal margin of FW black. Face pale. Area behind eyes with a few dark scales. Maxillary palpi very pale, 3rd segment with faint reddish line externally; length of 5th segment 1.57 times its width and 1.37 times length of 4th segment. Pronotum pale, yellow-brown. Posterior margin with white scales. FW's as in Fig. 322B. Lateral field dark, becoming paler ventrally. File with 73, 76 teeth (n=2). Femora I and II very pale. Tibia I and II with narrow dark line running dorsally from proximal end almost to distal end. In tibia II dark line is most pronounced in proximal region. All tarsi pale. Femur III very pale, with light brown scales on upper face; distal end with dark brown crescent-shaped markings on outer face. Tibia III: proximal region (approximately first 5th of tibia) very dark; beyond this tibia pale anteriorly and brown or reddish posteriorly between serrations. Dorsum of abdomen pale, about same color as pronotum; distal area between cerci dark; 9th tergite black along its posterior margin; 10th tergite (Fig. 322F) almost entirely black with broadly rounded lateral projection near inner base of each cercus, and with two small pointed projections on either side of median line separated from one another by about their length. Sternum very pale. Cerci pale throughout. Measurements in Table 34. A male from A-26 has 73 file teeth.

Females: Body color pale yellow-brown. Ovipositor length 2.69 times length of pronotum. Face pale, but with dark band extending from lower front corner of eyes medially onto frons. Frons with

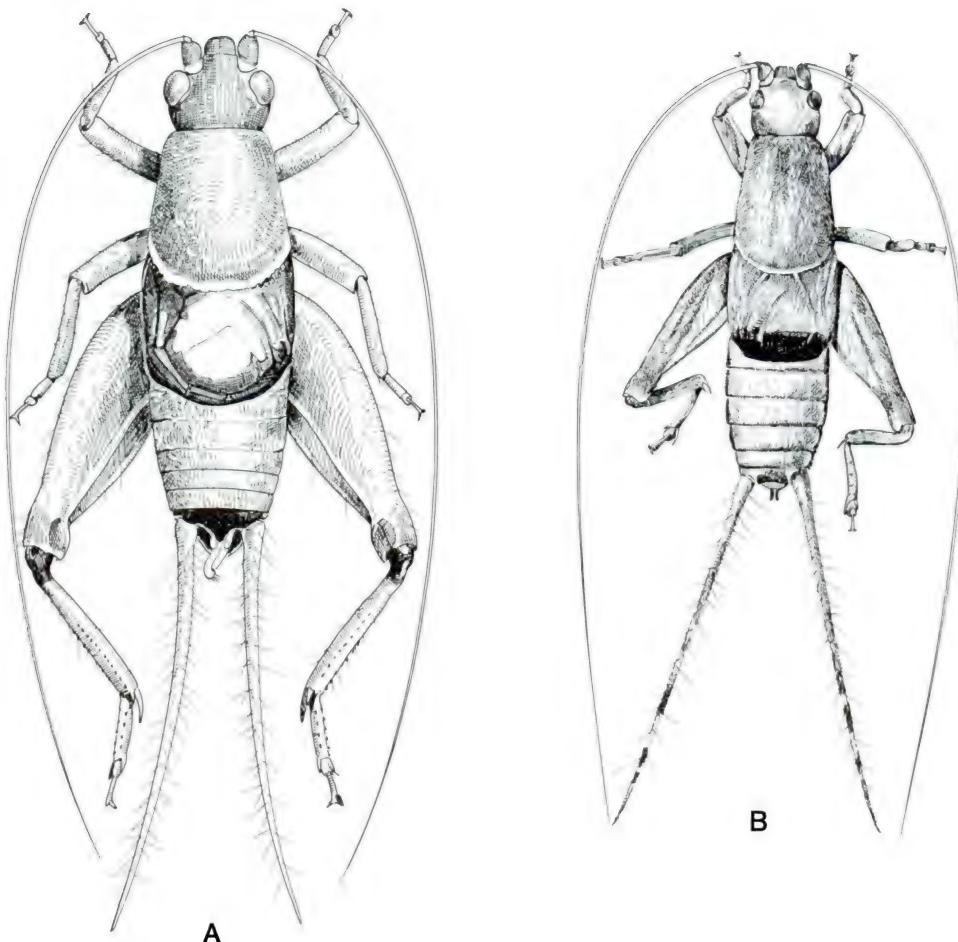


FIG. 320. A, *Lara nimmitabel*; B, *Collendina ora*.

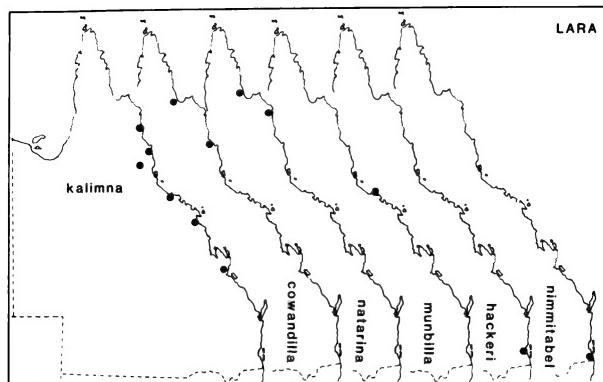
another horizontal line just above these lines. Maxillary palpi: 5th segment with dark distal ring. Length of 5th segment 1.13 times its width and 1.44 times length of 4th segment. Pronotum nearly unicolorous. Tibia I with dark narrow stripe running longitudinally on upper face extending from proximal end to about middle and slightly interrupted in region of tympanum. Tibia II with similar stripe at proximal end but becoming diffuse and largely reddish in distal two thirds. Femur III pale and with light yellow scales. Tibia III with dark brown band at proximal end (about 2× diameter of tibia, in length). This band first followed by short white band (half diameter of tibia), then by reddish streak which first becomes lighter then dark again in distal end. Top of abdomen same color as pronotum.

Ovipositor 5.2 mm long, slightly bowed throughout its length. Cerci pale throughout.

HOLOTYPE. ♂, A-4, Townsville, QLD, vii 1969, ANC.

SONG. Fig. 323. Succession of complex chirps, each composed of 2-pulse units, followed by 3-pulse unit.

	p/s		ch/s	kps	°C
	A	B			
A-4	33-37.0	20.0	0.8	5.0	18
A-26	62.5	33.3	1.67	—	21?
A-62	40.0	22.2	1.20	4.5	18
A-298	62.5	30.3	—	5.6	18
A-298	50.0	32.6	—	5.6	18
A-498	66.7	37.0	—	5.9	21

FIG. 321. Distributions of *Lara* species.

HABITAT. Found along bay in Townsville, on trunks of mangroves, 5–7 feet from ground.

SPECIMENS. Holotype ♂ ANC. A-26 3♂ ANC. A-285 1♀ ANC.

Lara munbilla n. sp., Fig. 322AG

RANGE. Type locality on Magnetic Island, QLD.

RECOGNITION. Males: Size and coloration much like *L. kalimna* but genital processes very different. Song (not taped) also similar to that of *L. kalimna*. Dorsum of head with dark markings. Tenth tergite of abdomen triangular and with a central point. Genital processes bifurcate. Face with series of dark markings and dark lines. Dorsum of head with three dark marks arranged in triangle between antennae and just behind transverse suture. Side of head with dark brown scales behind eyes. Antennal scape dark brown on venter. Maxillary palpi pale; length of 5th segment 0.76 times its width and 1.50 times length of 4th segment. Posterior margin of FW with dark brown band. Front of FW including anterior part of mirror darkened. File with 75 teeth

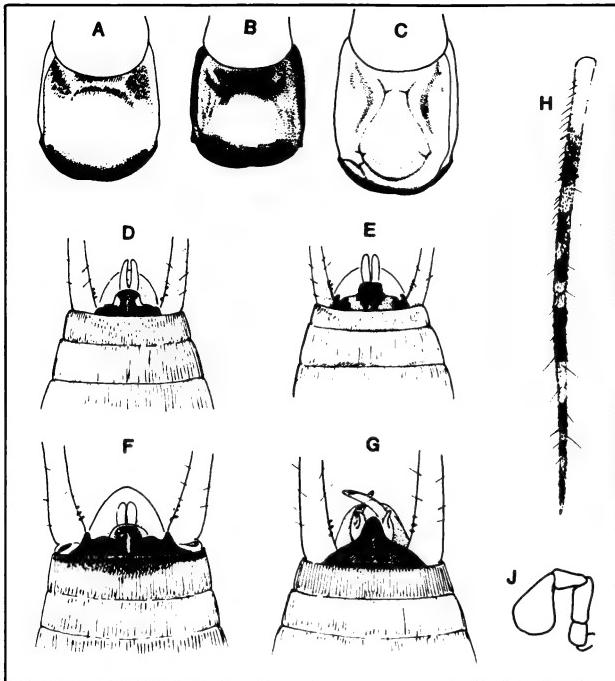


FIG. 322. *Lara*. A, FW's of *munbilla*; B, same of *kalimna*; C, same of *cowandilla*. D–G, end of abdomen (top view): D, *cowandilla*; E, *natarina*; F, *kalimna*; G, *munbilla*, symmetrical processes overlapping; H, cercus of *ora*; J, max. palp of *kira*.

($n=1$). Legs I and II pale. Femur III pale with light brown scales; lower outer distal face with a few small dark spots. Tibia III with black mark next to femur extending about $\frac{1}{6}$ the length of tibia; rest of tibia pale. Dorsum of abdomen a little darker than pronotum, 10th tergite dark brown, triangular and with distinct central projection (Fig. 322G). Venter of abdomen very pale anteriorly; subgenital plate brown anteriorly with small black spot at posterior

TABLE 34. Body proportions in the genus *Lara* (abbreviations as in Table 31).

		No. file teeth	BL BW	PL FWL	HW RW	RW RL	RW SW	FWL FWW	ML MW	FL TL	BL (mm)	FL (mm)
<i>kalimna</i>	H	73	—	1.13	3.50	1.10	1.22	0.88	0.89	1.38	8.9	4.3
A-26	P♂	76	—	—	—	—	—	—	—	—	9.2	5.0
	P♀	—	3.25	—	3.54	1.84	1.19	—	—	1.57	8.7	5.3
<i>munbilla</i>	H	75	3.0	1.11	4.15	1.33	1.11	0.83	1.02	1.40	8.3	4.7
<i>nimirabel</i>	H	—	—	1.38	3.20	—	1.20	—	—	—	8.1	5.1
<i>hackeri</i>	H	—	—	1.18	—	—	—	—	—	—	8.5	5.2
<i>natarina</i>	H	193	3.22	1.00	3.00	1.35	1.35	1.00	0.98	1.27	8.3	3.9
<i>cowandilla</i>	H	222	—	—	3.80	1.16	1.16	—	—	—	8.8	—

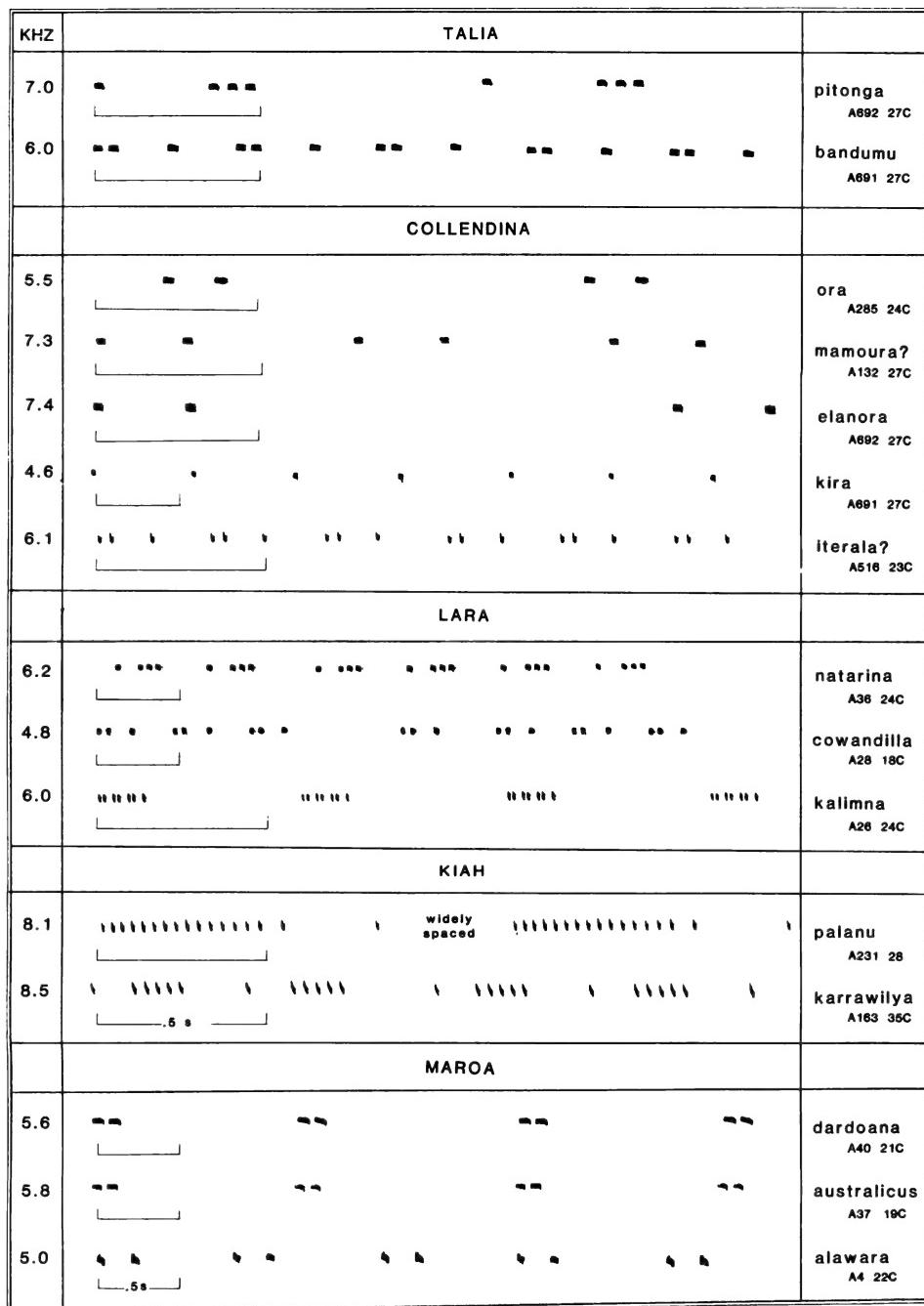


FIG. 323. Songs of *Talia*, *Collendina*, *Lara*, *Kiah*, and *Maroa* species. Scale = 0.5 s.

tip. Genital processes bifurcate, both processes flat and bladelike, one pale blade projects dorsally, the lower brown blade curves across the median line. Cerci generally pale. Measurements in Table 34.

HOLOTYPE. ♂, A-51, Magnetic Island, QLD, 13 ix 1968, ANC.

SONG. Not taped, complex chirp somewhat similar to that of *L. kalimna*.

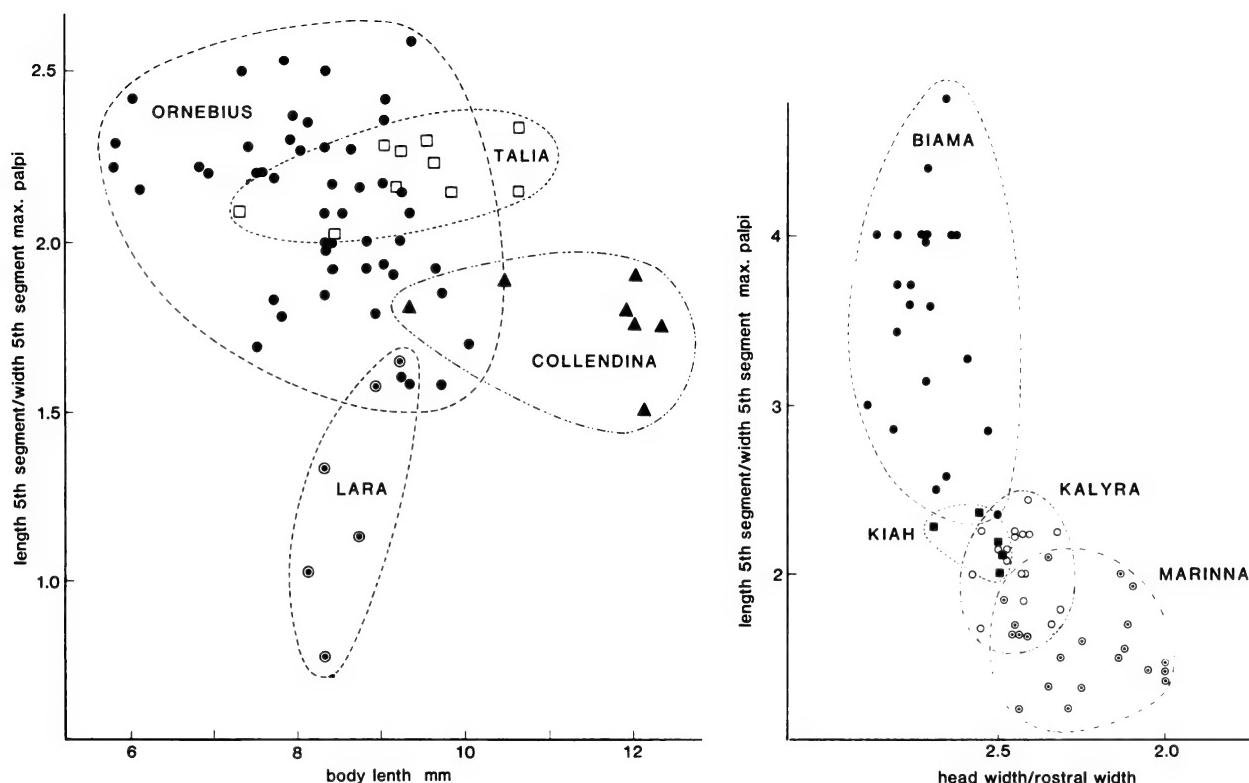


FIG. 324. Scatter diagram comparing body proportions in various mogoplistine genera.

HABITAT. Thickly wooded slope with tangle of undergrowth.

SPECIMENS. Holotype ♂ ANC.

Lara nimmitabel n. sp., Fig. 320A

RANGE. Type locality in extreme southeastern coastal QLD.

RECOGNITION. Males: Head and thorax light brown. Abdomen darker brown but nearly covered with grey scales. FW's dark brown, pale, or milky white in center. Last tergite of abdomen black. Genital processes asymmetrical; left one has three processes—an acute one directed dorsally, a short ventral one directed posteriorly and one with tuft of setae at terminal end directed posteriorly; right one has a dorsal pointed process and a posterior projection terminating in two closely spaced blunt points. Tibiae III with dark brown band at proximal end (about twice tibial diameter in width). Face pale and with network of dark brown markings on frons. Measurements in Table 34.

HOLOTYPE. ♂, Surfers Paradise, QLD, 5 x 1958 (R. Metcalf) UQC.

SONG. Not known.

HABITAT. Coastal forest and shrubbery.

SPECIMENS. Holotype ♂ UQC.

Lara hackeri (Chopard)

Ornebius hackeri Chopard 1951. Holotype ♂, Brisbane, QLD, 24 v 1925 (H. Hacker) QM. Type examined.

RANGE. Type locality in Brisbane, QLD.

RECOGNITION. Males: Similar to *L. nimmitabel* and *L. munilla* but differing in shape of genital processes. Head and frontal rostrum dark brown. First two segments of antennae darker brown. Pronotum reddish; posterior margin with pale grey scales. Abdomen brown with grey scales. Tenth tergite dark brown with straight posterior margin. Genital processes brown, flattened laterally, and terminating in a single process. Cerci pale. Femora yellowish; tibiae dark brown. FW's with dark lat-

eral and posterior margins and a pale milky area in middle. Pronotal length 1.18 times tegminal length.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ QM.

Lara natarina n. sp., Fig. 322E

RANGE. Northern coastal QLD.

RECOGNITION. Males: General body coloration pale, yellow-brown on head, pronotum, and legs; a more reddish brown on abdomen. FW's with reddish band along posterior margin. Distal end of abdomen with three distinct dark markings. Posterior margin of pronotum with row of white scales. Posterior margin of FW's (viewed together) with a continuous, reddish brown, transverse band; darkest portion in each FW at postero-lateral corner; lateral veins of each FW reddish; diagonal vein, medial mirror vein, and anterior mirror vein darker than surrounding membrane where they join. Mirror with incomplete dividing vein. Lateral surface of FW's pale except for reddish veins. File with 193 teeth. Legs pale throughout and partly covered with light brown scales. Top of abdomen rusty brown. Tenth tergite pale centrally, and (in life) with two dark brown, spinelike, posteriorly projecting processes centrally (Fig. 322E). Dorsum of abdomen dark brown at distal end. Venter of abdomen pale. Valves of genital processes pale. Cerci (broken off) pale with uniform scattering of light brown scales. Measurements in Table 34.

HOLOTYPE. ♂, A-40, Cape York Peninsula, QLD, 10 vii 1968, ANC.

SONG. Fig. 323. Succession of complex chirps, each chirp containing isolated pulse followed by 2–4 (usually 3) pulses. One full group contained 14 chirps. Taped male near Wenlock River believed to be this species sang 1.8 ch/s, but 2-pulse units rather than 3 followed single pulse.

	p/s				
	A	B	ch/s	kps	°C
A-36	20.0	7.1	1.7	6.2	23
A-40	16.7	5.9	1.4	5.7	21

HABITAT. Sing from clumps of saplings and piles of dead vines and brush. Near Cooktown, lone male

sang at night about 10 feet above ground in sapling in dry wash.

SPECIMENS. Holotype ♂ ANC.

Lara cowandilla n. sp., Fig. 322CD

RANGE. Northern coastal QLD.

RECOGNITION. Males: Specimen damaged but similar to *L. natarina*, differs in possessing dark markings on face and palpi, and reddish brown femora and tibiae. Pronotal length 1.52 times length of head; tegmen damaged, but notes taken before specimen was damaged say, "wing longer than pronotum"; body length ca. 3.00 times greatest body width. Face (front view) with dark stripe extending from lower front edge of eyes medially onto frons, curving upward on either side of median line to middle of frons and dissipating to form a series of faint spots at top of frons; another dark spot occurs on frons bordering middle section of epistomal suture. Cheeks with patch of dark scales immediately below middle of eye. Third and 4th segments of maxillary palpi with longitudinal dark (reddish) stripes, 5th segment with distal dark ring and proximal dark area. Posterior half of pronotum distinctly darker than anterior half. Posterior margin of FW's (from notes taken before specimen was damaged) with continuous but narrow band. Posterior mirror vein dark. Lateral field largely pale, veins slightly darkened. File with 222 teeth. Femora I and II yellow proximally, reddish in distal third; tibiae I and II reddish; tarsi lighter than tibiae. Hind legs missing. Dorsum of abdomen reddish brown; 10th tergite with two lateral dark areas (Fig. 322D). Terminal portion of tergum dark, reddish. Genital processes pale. Sternum lighter than tergum. Measurements in Table 34.

HOLOTYPE. ♂, A-39, 3 miles north of Musgrave, QLD, 10 vii 1968, ANC.

SONG. Fig. 323. Double-pulse unit followed by single pulse; at A-40 male sang 1.4 chirps/s.

	p/s				
	A	B	ch/s	kps	°C
A-38	20.0	7.1	2.2	—	18

HABITAT. Males sang at night in shrubbery in open eucalypt forest.

SPECIMENS. Holotype ♂ ANC.

COLLENDINA n. gen.

TYPE SPECIES. *Collendina ora*, n. sp.

The six species are from forested areas: *C. iterala*, *C. ora*, and *C. fascipes* from forests of eastern QLD, and *C. elanora*, *C. kira*, and *C. namoura* from forests around Darwin.

RECOGNITION. Members of this genus are large (more than 9 mm long) and relatively slender, with a body length at least 3.75 times greatest body width. Length of exposed FW's ranges from 0.50 to 0.69 times exposed abdomen length, and greatest head width at least 3 times rostral width. In females ovipositor length varies from 2.61 to 3.10 times pronotal length. Hind tibiae also tend to be shorter, with ratio of femur length to tibia length varying from 1.35 to 1.78.

KEY TO COLLENDINA MALES

1. Genital processes brown and asymmetrical (Fig. 326H). FW's (Fig. 326C) with ca. 66 file teeth *iterala*
- Genital processes nearly black, symmetrical 2
2. Last three tergites of abdomen covered with black scales *fascipes*
End of abdomen not patterned as above, but may become gradually blackish 3
3. Lateral surfaces of abdomen covered with dark scales (Fig. 320B). Pronotal length more than 1.3 times FW length. File with ca. 227 teeth *ora*
Lateral surfaces of abdomen without dark scales. Pronotal length less than 1.2 times FW length 4
4. FW's as in Fig. 326A. Femur III length ca. 2.0 times tibial length. File with ca. 171 teeth *kira*
FW's as in Fig. 326B. Femur III length less than 1.8 times tibial length. File with ca. 207 teeth *elanora*

***Collendina ora* n. sp., Fig. 326FJ**

RANGE. Type locality in northcentral coastal QLD.

RECOGNITION. Males: Large slender species, body color reddish brown, abdomen with black scales on lateral surfaces. Head reddish brown, darker behind eyes. Face without distinct dark marks. Maxillary palpi very distinctly ensiform. Length of 5th segment 1.76 times its width and 1.61 times length of 4th segment. Pronotum reddish brown; disk with light brown scales, lateral lobes with dark brown scales; posterior margin with light scales. FW's with broad, posterior dark band extending about $\frac{1}{3}$ of the way into mirror. Lateral field of FW's dark brown ventrally and pale dor-

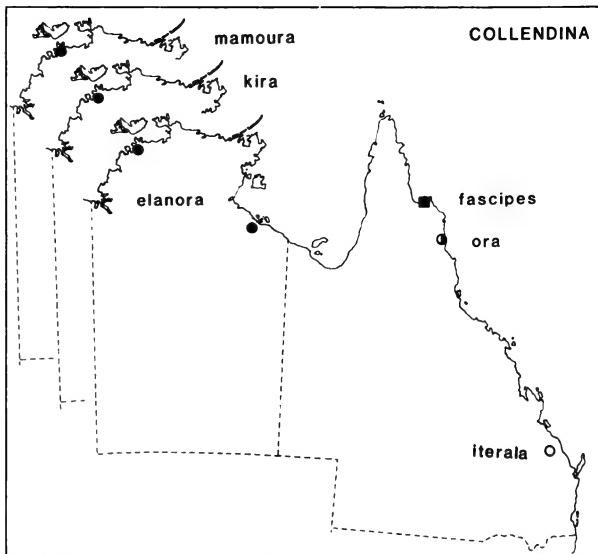


FIG. 325. Distributions of *Collendina* species.

sally. File with 227 teeth. Femora I and II brownish with darker scales on outer face. Tibiae I and II reddish, not distinctly banded, about same color as pronotum. Tarsi distinctly lighter than tibiae. Femur III with broad longitudinal dark patch of scales on top outer face, extending most of the length of femur. Tibia III reddish brown, unbanded. Femur III length 1.78 times length of tibia. Top of abdomen reddish brown; about same color as pronotum, and becoming slightly darker in last few segments. Tenth tergite black along its posterior margin. Sides of abdomen (membranous area) with black scales. Measurements in Table 35.

HOLOTYPE. ♂, A-285, Cape Tribulation, QLD, 29 x 1968, ANC.

SONG. Fig. 323. Pairs of pulses.

	p/s	ch/s	kps	°C
A-285	6.5	0.7	5.5	24

HABITAT. Male was 10 to 15 feet up in tree in rain forest.

SPECIMENS. Holotype ♂ ANC.

***Collendina fascipes* (Chopard)**

Ornebius fascipes Chopard 1951: 443. Holotype ♂, Bathurst Head, QLD, i 1927 (Hale and Tindale) SAM. Type examined.

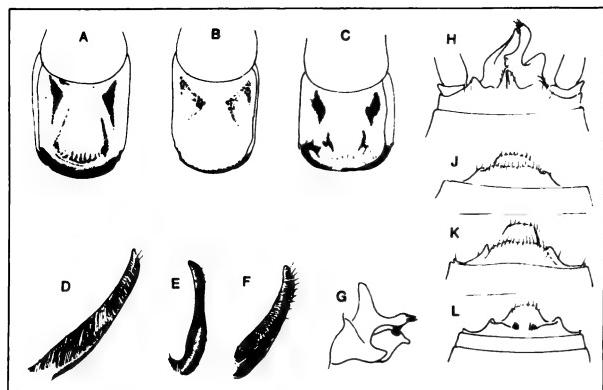


FIG. 326. *Collendina*. A, *kira* FW's; B, *elanora* FW's; C, *iterala* FW's; D, *kira* genital process; E, *elanora* genital process; F, *ora* genital process; G, *iterala* genital process. H-L, end of abdomen (top view). H, *iterala*; J, *ora*; K, *kira*; L, *elanora*.

RANGE. Type locality in north central coastal QLD.

RECOGNITION. Following is the description of Chopard for the holotype and allotype: Holotype. "♂. Rather large size; rufous with darker head and apex of abdomen; legs fasciated with brown. Head very dark brown; frontal rostrum as wide as first antennal segment, furrowed; facial protuberance projecting. Antennae yellowish. Palpi yellowish brown; fourth segment very short, fifth large, subsecundiform, obliquely truncated at apex (fig. 44). Pronotum very feebly narrowing anteriorly, with posterior margin slightly convex; disk rufous, provided with silvery scales forming a narrow white band along the anterior and posterior margins; lateral lobes wholly covered with white scales. Abdomen covered above with whitish scales to the seventh tergite, the three last tergites covered with

bright black scales; beneath the basal scales are rather yellowish. Subgenital plate wide, triangular with posterior margin feebly convex, with long bristles; superior anal valves transverse, with straight apical margin. Process of the inferior anal valves cylindrical, obliquely erect and very weakly curved at apex which is blunt. Anterior and middle legs rather short; femora covered with silver scales with near the apex a large brown band; tibiae with a similar but less distinct band at base, anterior tibiae perforated on internal face with a rather large round tympanum. Posterior femora rather thick, darkened at apex and with a large brown oblique spot above and on the superior part of the external face; tibiae short, strongly denticulated; metatarsi compressed, rather stout, bearing on each superior margin 5-6 denticles, the apical spurs short and strong. Elytra covered by pronotum nearly to the angle of the mirror, yellowish with very dark apical band; mirror very large, as long as wide, with feebly arched posterior margin, anterior angle rounded; lateral field yellow.

"♀. Head and legs as in the male. Pronotum a little longer than wide, with anterior and posterior margins straight, sides a little convex; disk rufous with white scales chiefly numerous along the posterior margin. Abdomen blackish with rufous base; subgenital plate black, rather strongly notched at apex. Cerci long, yellowish at base, vaguely annulated with white and brown towards their apex. Ovipositor rather long, straight with apical valves ovato-lanceolate, their inferior margin very finely denticulated, pubescent.

"Length of body ♂ 10 mm.; ♀ 10.5 mm.; pronot. ♂ 3.5 mm., ♀ 2.8 mm.; post. fem. ♂ 5.3 mm., ♀ 5.5 mm.; ovipositor 6 mm.

TABLE 35. Body proportions in the species of *Collendina* (abbreviations as in Table 31).

		No. file teeth	PL FWL	FWL AL	HW RW	RW RL	RW SW	FWL FWW	ML MW	FL TL	BL (mm)	FL (mm)	CL (mm)
<i>ora</i>	H	227	1.39	0.69	3.19	2.28	1.14	0.69	0.89	1.78	12.2	6.3	9.0
<i>fascipes</i>	H	?	—	—	—	—	—	—	—	—	10.0	5.3	—
<i>iterala</i>	H	66	1.36	0.40	3.33	1.42	1.24	0.84	0.87	1.35	12.1	5.8	11.3
	P♀	—	—	—	3.27	1.30	1.25	—	—	1.47	—	—	—
<i>elanora</i>	H	207	1.03	—	3.04	1.44	1.37	1.15	1.23	1.72	9.3	4.8	5.8
	P♀	—	—	—	3.10	1.40	1.33	—	—	1.76	—	—	—
<i>kira</i>	H	171	1.17	0.57	3.07	1.46	1.30	1.03	1.18	2.03	11.9	5.4	6.6
<i>mamoura</i>	H♀	—	—	—	—	—	—	—	—	—	11.8	5.7	8.8

"A rather large species, well characterized by its colouration and by the shape of the maxillary palpi.

"Body measurements (mm): BL ♂, 10; 10.5; PL ♂, 3.5; ♀, 2.8; FL ♂, 5.3; ♀, 5.5; OL 6."

SONG. Not known.

HABITAT. Probably coastal forests.

SPECIMENS. Holotype ♂ SAM.

Collendina iterala n. sp., Fig. 326CH

RANGE. Type locality in mountains of southeastern QLD.

RECOGNITION. Males: Body color reddish brown. Dorsum of head orange-brown; rostrum and margins bordering antennal sockets dark brown. Scape darker than region between eyes. Face largely pale, except for top of frons which is dark and has two dark lines extending horizontally from lower front corner of eyes medially onto frons. Scape dark brown beneath. Disk of pronotum with 4 small spots in anterior half, two in each anterior quarter; front two larger than back two. Lateral margin of disk with line of dark scales; posterior margin with white scales. Front margin with 6 or 7 prominent dark setae. FW's relatively short. Posterior margin with continuous dark band (FW's seen together) (Fig. 326C); however, dark band on each FW extends from posterior lateral corner to about middle. File with 66 teeth. Femora I and II pale with light brown scales. Tibiae I and II slightly darker than femora. Tibia I with dark, narrow longitudinal stripe on top proximal end. Tibia II darker than tibia I, also with dark narrow proximal longitudinal stripe, but with darker transverse band near distal end. Distal end of femur III with dark mark on each side; two dark spots on outer surface in distal half. Tibia III with very dark proximal band (about 2× diameter of tibia in width). Dorsum of abdomen reddish brown. Tenth tergite very dark, black next to inner base of each cercus. Sternum pale with dark spots, one row on either side of medial line. Genital processes asymmetrical, brown, and with several projections (Fig. 326H). Cerci uniformly light brown. Measurements in Table 35.

Females: Margin of head bordering antennal sockets black. Area behind eyes with dark scales. Face largely pale; frons pale ventrally becoming darker and forming a network of dark lines dorsally. Dark band from lower front corner of eyes extends

medially onto frons to middle of frons. Lateral margin of pronotal disk with line of dark scales. Dorsal surface with four small dark rings, one in each quarter. Legs as in male, but distal outer face of femur III with 5 spots. Lateral margin of each abdominal tergite with darker scales. Dorsum of abdomen with 4 rows of small dark rings of scales, two rows on either side of medial line; each spot located nearer posterior edge of each tergite. Tenth tergite very dark. Venter of abdomen without dark spots, and quite pale. Ovipositor mostly straight slightly curved near base. Ovipositor length 6.6 mm and 3.0 times as long as pronotum.

HOLOTYPE. ♂, A-517, Cedar Creek, QLD, 22 ii 1969, ANC.

SONG. Fig. 323. Not determined with certainty, but we believe it to be an alternation of double and single pulses.

HABITAT. Collected on stem of large tree in forested gully.

SPECIMENS. Holotype ♂ ANC. A-517 1♀ ANC.

Collendina elanora n. sp., Fig. 326BEL

RANGE. Darwin area, NT.

RECOGNITION. Male: Head and pronotum yellowish. FW's with narrow posterior dark band. Abdomen darker than head and pronotum. Dorsum of head more or less unicolorous. Face pale, yellowish. Pronotum orange; posterior margin of disk with light scales. FW's patterned as in Fig. 326B. Type with 207 file teeth. Femora I and II pale. Tibiae I and II reddish, not distinctly banded. Tibia II slightly darker than tibia I. Femur III pale with yellowish scales on top and outer surfaces and with brown ring near distal end. Tibia III short and with two dark bands between serrations, one proximal band about 1.5 tibial diameters and one distal band about 2 tibial diameters. Tarsi pale. Dorsum of abdomen brown; considerably darker than pronotum, nearly black distally. Tenth tergite nearly black (Fig. 326L). Venter of abdomen mostly pale, subgenital plate dark brown. Sternites (except subgenital plate) with small dark spots. Genital processes black, slightly hooked distally. Cerci pale with patches of dark scales, but not distinctly banded. Measurements in Table 35.

Females: Head and pronotum yellowish; abdomen slightly darker especially in distal half; abdomen black between cerci. Face without distinct

dark marks. Legs as in male. Ovipositor bowed at base, otherwise nearly straight. Cerci with definite dark patches causing them to appear slightly banded. Ovipositor length 5.7 mm and 2.61 times as long as pronotum.

HOLOTYPE. ♂, A-692, Darwin, NT, 24 ix 1968, ANC.

SONG. Fig. 323. Groups of double-pulse chirps with chirps at 0.4/s.

	p/s	ch/s	kps	°C
A-692	3.6	0.4	7.4	27

HABITAT. Collected at East Point just east of Darwin at edge of forest.

SPECIMENS. Holotype ♂ ANC. A-692 1♀ ANC. Casuarina Beach, Darwin, NT, 22 x 1972 (Common, Edwards) 1♂ ANC. 15 km NE Darwin, Holmes Jungle, 11 iii 1961 (Gressitt) 1♂ BISH. Near Borroloola, NT, 30 x 1975 (Upton) 1♂ ANC.

LISTENING RECORDS. A-131, A-132, A-142.

Collendina kira n. sp., Fig. 326AK

RANGE. Type locality in Darwin area, NT.

RECOGNITION. Males: Pronotum and head yellowish, legs very pale. Area between cerci dark. Eyes dark, iridescent green. Face, pale and without dark markings. Pronotum yellowish; posterior margin of disk with whitish scales; lateral margins as seen from top, slightly concave. Posterior margin of FW's with continuous dark band which fades gradually anteriorly (Fig. 326A); posterior mirror vein included in darkened area. Each FW dark along entire posterior margin. File with 171 teeth. Femora very pale, nearly white. Tibiae I and II slightly darker than femora, unbanded. Femur III very pale, with light brown scales, darker at distal end. Tibia III brown, very short (Table 35). Distal end of tibia dark brown. Dorsum of abdomen grey-brown, somewhat darker than pronotum. Tenth tergite mostly dark brown (Fig. 326K). Subgenital plate dark brown, posterior edge nearly black. Genital processes nearly black and pointed. Cerci unbanded, pale proximally, darker distally. Measurements in Table 35.

HOLOTYPE. ♂, A-691, Darwin, NT, 24 ix 1968, ANC.

SONG. Fig. 323. 4–8 pulses delivered singly, sound low pitched. Not seen singing.

	p/s	kps	°C
A-691	1.6	4.6	27

HABITAT. Found in mangroves in Darwin.

SPECIMENS. Holotype ♂ ANC. A-691 1♀ ANC.

Collendina mamoura n. sp.

RANGE. Type locality in Darwin area, NT.

RECOGNITION. Females: Large species evidently very close to *C. kira* and differing mainly in length of hind femora relative to hind tibiae. Head and pronotum orange; abdomen brown but last 3 segments becoming dark brown and black. Femora I, II, and III pale with light brown scales. Femur III becoming dark brown distally. Tibiae darker than femora, especially on upper surface. Femur III 1.73 times as long as tibia. Top of abdomen lighter brown anteriorly, becoming dark brown and black in last 3 segments; 10th tergite between cerci nearly black. Anterior segments of sternum pale, last 2 segments brown. Subgenital plate distinctly notched. Ovipositor 6.1 mm long and 2.82 times as long as pronotum. Cerci very pale proximally, becoming darker distally; also somewhat banded in distal two-thirds.

HOLOTYPE. ♀, A-132, Casuarina Beach, near Darwin, NT, 25 ix 1968, ANC.

SONG. Fig. 323. Not known. Possibly either of two songs taped at A-132 but not associated with female.

	p/s	ch/s	kps	°C
A-132 n=2	3.7, 4.2	1.3, 1.41	6.9	27

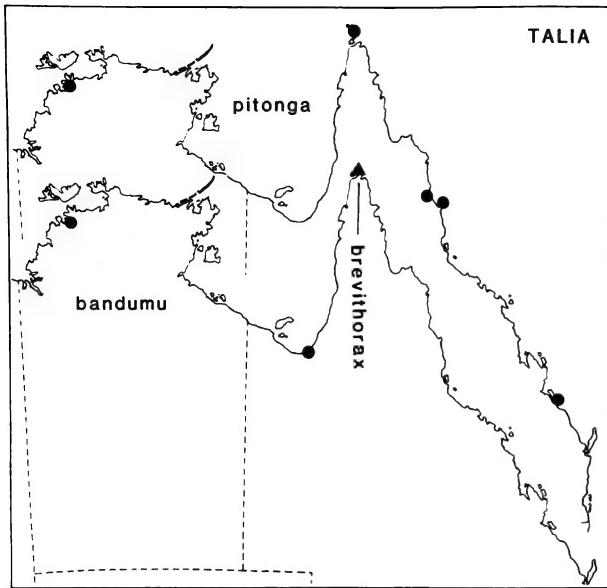
HABITAT. Found in undergrowth in monsoon forest east of Darwin, NT.

SPECIMENS. Holotype ♀ ANC.

TALIA n. gen.

TYPE SPECIES. *Talia pitonga* n. sp.

Three species are known: *T. bandumu* from the Darwin area, *T. pitonga* from coastal Queensland and *T. brevithorax* from islands in the Torres Strait. All three species are medium in size and occur in

FIG. 327. Distributions of *Talia* species.

mangroves of eastern and northern coastal Australia.

RECOGNITION. Head and pronotum yellowish. Face without prominent dark markings. FW's with bright red posterior band in live or fresh specimens (specimens in alcohol lose red coloration). Tenth tergite of abdomen dark centrally (Fig. 328). Genital processes black. Cerci unbanded.

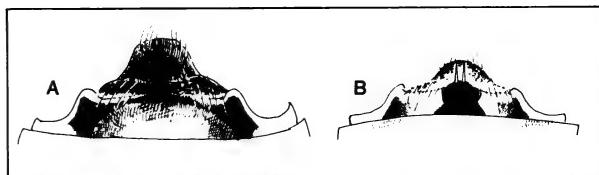
KEY TO *TALIA* SPECIES

1. FW length greater than pronotal length. (File with ca. 213 teeth.) (NT) *bandumu*
- FW length distinctly less than pronotal length 2
2. Body length more than 8.0 mm. File with ca. 249 teeth
(eastern QLD and NT) *pitonga*
- Body length less than 8.0 mm (Torres Strait) .. *brevithorax*

Talia pitonga n. sp., Fig. 328B

RANGE. Coastal QLD and NT, Torres Straight.

RECOGNITION. Males: Head and pronotum yellowish. Abdomen dark brown, nearly black. Back of head with 8 longitudinal stripes; scales forming these bands distinctly darker than background color. Face very pale, without dark markings. Frons nearly white. Scape with dark scales on upper face. Maxillary palpi largely pale, but 5th segment with distinct ring around distal edge. Length of 5th segment 2.27 (2.00–2.27) times its width and 1.56 (1.39–1.56) times length of 4th segment. Pronotum yellow-

FIG. 328. *Talia*. End of abdomen of A, *bandumu*; B, *pitonga*.

ish with brown scales. Posterior margin with brown scales. Lateral lobes without brown scales. Posterior margin of FW's with broad dark red band; remaining portion transparent. Lateral field entirely pale (transparent). File with 245–249 teeth (n=3). (Holotype has 249 teeth; a male from Green Isl., QLD, 246 teeth; a male from Darwin, 245 teeth.) Femora I and II with dark scales. Tibiae I and II with scales arranged in faint bands. Tarsi roughly similar to tibiae in color, but 2nd tarsal segments with two dark lateral stripes, and 3rd tarsal segment dark at distal end. Femur III with pale background, scales not as dark as in femora I and II. Tibia III with three reddish spots, one located distally and two in proximal half. Dorsum of abdomen nearly black with some grey scales. Tenth tergite with dark central band, two lighter lateral bands, and two dark areas near bases of cerci. The two lateral projections are pale. Venter of abdomen distally becoming brown anteriorly. Cerci more or less unicolorous, covered with light brown scales. Genital processes black and pointed. Measurements in Table 36.

Females: Head colored as in male. Maxillary palpi brown in distal half; length of 5th segment 2.15 times its width and 1.40 times length of 4th segment. Disk of pronotum with brown scales; lateral lobes without brown scales. First three abdominal tergites as pale as pronotum; last tergites nearly black. Ovipositor 4.5 mm long and 2.57 times as long as pronotum. Venter of abdomen largely dark, subgenital plate largely pale and without distal notch.

HOLOTYPE. ♂, A-32, Port Douglas, QLD, 5 viii 1968, ANC.

SONG. Fig. 323. Complex chirps containing one separated pulse followed by three together; chirps produced every 2.3 seconds. Pulse and chirp rates of Darwin males somewhat faster and interval between single pulse unit and following 3-pulse units more nearly equal.

TABLE 36. Body proportions in *Talia* species (abbreviations as in Table 31).

		No. file teeth	BL BW	PL FWL	FWL AL	HW RW	RW RL	RW SW	FWL FWW	BL (mm)	FL (mm)	CL (mm)
<i>pitonga</i>	H	245-249	3.48	1.07	0.57	3.04	1.78	1.47	0.86	9.0	4.3	5.4
	P♂	—	3.06	1.21	0.63	2.96	2.08	1.39	0.77	8.4	4.3	—
	P♂	—	3.43	1.26	0.83	3.03	—	1.47	0.80	9.2	—	—
	P♀	—	—	—	—	2.86	2.07	—	—	10.6	4.9	6.3
<i>bandumu</i>	H	213	3.10	0.93	1.14	3.26	1.42	1.35	0.95	9.8	5.1	7.3
	P♂	—	3.00	0.86	1.14	3.23	1.53	1.44	1.04	9.5	4.8	8.0
<i>brevithorax</i>	H	—	—	—	—	—	—	—	—	7.0	4.0	—

p/s					
A	B	ch/s	kps	°C	
A-32	11.8	2.8	—	5.5	21
A-130	15.4	2.1	—	—	27
A-692	18.2	2.9	0.5	—	27

HABITAT. Dense population in patch of mangroves about 3 feet high just behind beach; males sang at night near top of vegetation. Found behind beach in wooded area near Darwin.

SPECIMENS. Holotype ♂ ANC. A-32 4♂ 4♀ ANC A-132 1♂ ANC, 1♂ 1♀ ANSP. A-282 1♂ 1♀ ANC. Heron Island, QLD, 20 ix 1972 (Chapman) 3♂ 3♀ ANC. Sue (Warraber) Island, QLD, 28 i 1978 (Lewis) 2♂ ANC. Green Island, QLD, 14 ix 1935 (Swezey) 1♂ BISH.

Talia bandumu n. sp., Fig. 328A

RANGE. Gulf coast QLD and coastal NT.

RECOGNITION. Males: Body color pale yellow. Eyes in life iridescent green. FW's in fresh specimens red along medial, lateral, and posterior margins (in alcohol faded to light brown). Dorsum of head pale. Face pale. Antennae scarcely banded. Maxillary palpi pale; length of 5th segment 2.14 times its width and 1.42 times length of 4th segment. Pronotum pale yellowish, posterior margin with light scales. File with 213 teeth ($n=1$). Legs very pale. Tibia III with dark spot between serrations about one tibial diameter from distal end. Another male has three reddish bands (as in *T. pitonga*). Dorsum of abdomen pale, with some brown scales at lateral margins of last few segments. Tenth tergite with very black lateral areas next to bases of cerci; but lateral projections themselves white; posterior extremity nearly black. Central portion of 10th tergite pale. Venter of abdomen pale. Genital

processes pointed and black. Cerci pale and slender. Measurements in Table 36.

HOLOTYPE. ♂, A-691, Darwin, NT, 24 ix 1968, ANC.

SONG. Fig. 323. Alternation of double-pulse units and single pulses, all began with pair of pulses. One song contained 3-pulse units instead of two. One song contained 12 (2+1) groups, another 20 such groups.

p/s					
	A	B	ch/s	kps	°C
A-691 n=3	22.2	4.4-6.1	2.3-2.4	6.0	27
A-253	20.0	5.9	1.9	5.4	26
A-253	22.2	3.5	—	5.3	26

HABITAT. Collected on mangroves at Darwin. Its red and pale coloration matches mangrove foliage very well.

SPECIMENS. Holotype ♂ ANC. A-691 2♂ ANC.

LISTENING RECORDS. A-143.

Talia brevithorax (Chopard)

Ornebius brevithorax Chopard 1951: 439. Holotype ♂, Torres Straits, Murray Island (A. M. Lea) QM. Type examined.

RANGE. Type locality on Murray Island, Torres Straits.

RECOGNITION. Chopard furnishes the following description:

"♂. Small; testaceous covered with grey scales. Head a little flattened; frontal rostrum a little wider than the first antennal segment, furrowed. Face yellowish. Antennae and palpi yellowish; fourth segment of maxillary palpi short, wide, fifth as long as the third, triangular in shape. Pronotum feebly narrowing in front, remarkably short, with anterior

margin feebly concave, angles rounded, posterior margin widely rounded but weakly convex. Abdomen blackish, covered with grey scales; process of the anal valves blackish, a little obliquely erected, compressed in the shape of a small, rather wide lamella, subacute at apex (Fig. 40). Cerci very long, yellowish. Legs short, of the same colour as the body. Anterior tibiae perforated with a small round tympanum; anterior and median tarsi very short. Posterior tibiae a little curved; metatarsi armed with 5–6 strong denticles above on each margin. Elytra feebly whitish with rufous brown posterior margin; mirror large with wholly rounded anterior margin.

"♀. Anterior part of the body yellowish testaceous; posterior half of the abdomen blackish brown. Head as in the male. Pronotum a little longer than wide, feebly narrowing in front, with straight anterior and posterior margins, rounded anterior angles. Cerci long, pale yellowish. Ovipositor rather short and thick; apical valves feebly enlarged, lanceolate with straight superior margin, smooth, the superior ones bearing 4 long bristles near the apex of the inferior margin.

"Length of body ♂ 7 mm., ♀ 7.5 mm.; pronot. ♂ 2.2 mm., ♀ 1.8 mm., post. fem. ♂ 4 mm., ♀ 4.2 mm.; elytra ♂ 1.8 mm.; ovipositor 3 mm.

"The male of this species is remarkable in its short pronotum and also in the elytra which are not much longer than the pronotum itself; the female is close to that of *australicus* but with a very short ovipositor."

SONG. Not known.

HABITAT. Probably beach shrubbery or mangroves.

SPECIMENS. Holotype ♂ QM.

MAROA n. gen.

TYPE SPECIES: *M. dardoana* n. sp.

Three species are from forested areas of eastern Queensland, and one species, *M. dardoana*, is from the open grassy woodland of Cape York Peninsula.

RECOGNITION. This genus comprises a diverse assemblage of species. They are characterized by having black genital processes and more than 220 file teeth. The length of the fifth segment of the maxillary palpi varies from 2.20 to 2.70 times its

greatest width. Females are scarce in collections and we have not provided any means of identifying them. The genus is most similar to the genera *Collendina* and *Talia*, which also possess black genital processes, but the former have a long narrow appearance while the latter are broad and have red pigmentation along the posterior margin of the FW's.

KEY TO MAROA MALES

1. Body color pale, yellowish. Posterior margin of FW's viewed together with 3 dark marks—two lateral ones and one central one (Fig. 330B) *dardoana*
Body color brownish. FW's not marked as above 2
2. FW's with posterior edge continuously dark brown 3
Posterior margin of FW's (viewed together) with two small brown spots one at each posterior corner (Fig. 330A) *australicus*
3. Pronotum reddish brown. Distal end of femur III ringed with dark band *alawara*
Pronotum yellow. Distal end of femur III not ringed with dark band *indiwarra*

Maroa dardoana n. sp., Fig. 330B

RANGE. Type locality in northern coastal QLD.

RECOGNITION. Males: Body very pale, posterior margin of FW's with three black spots. Dorsum of abdomen with four rows of black spots. Genital processes black. Face almost white. Dorsum of head very pale with light brown scales arranged in indistinct longitudinal rows. Darkest scales behind eyes. Maxillary palpi: length of 5th segment 2.27 times its width and 1.04 times length of 4th segment. Pronotum very pale, with two dark spots (groups of black scales) in each anterior quarter. Posterior margin of FW's (seen together) with three black spots, but each FW actually has only two such spots, a central one and one at the posterio-lateral edge. Lateral field pale. File with 474 teeth. Legs nearly white in background and with light brown scales. Each abdominal tergite, including 8th, with 4 dark spots; 9th tergite with only two more central spots. Genital processes black. Cerci pale with scattered light brown scales. Measurements in Table 37.

HOLOTYPE. ♂, A-40, 10.5 miles N of Musgrave, QLD, 10 viii 1968, ANC.

SONG. Fig. 323. Groups of double-pulse chirps.

	p/s	ch/s	kps	°C
A-40 n=5	9.1–10.0	0.7–0.8	5.3–5.6	21

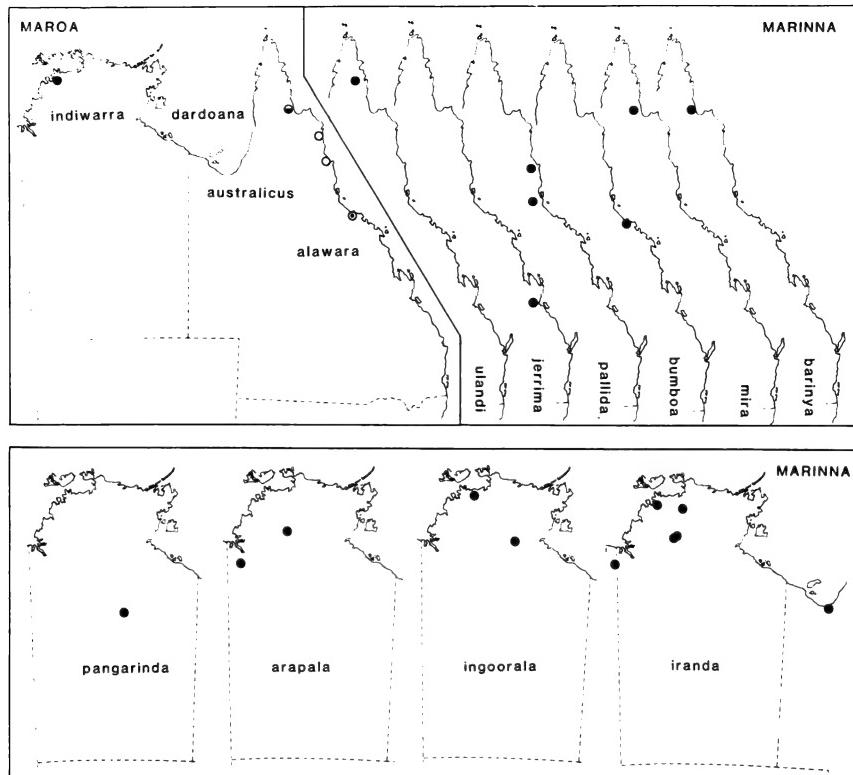


FIG. 329. Distributions of *Maroa* and *Marinna* species.

HABITAT. Low dry grass.

SPECIMENS. Holotype ♂ ANC.

Maroa australicus (Chopard), Fig. 330A

Lipholplus australicus Chopard 1925: 26. Holotype ♂, Yarrabah, Queensland (Mjöberg) SM. Transferred to *Ornebius* by Chopard 1951: 438. Type examined.

RANGE. Northern coastal QLD.

RECOGNITION. Males: Head and pronotum yellow-brown, head with dense covering of scales. FW's with two dark spots at posterior margin. Abdomen much darker than pronotum and head. Face lighter above, darker below, with faint scattered brown spots. Maxillary palpi: length of 5th segment 2.42 times its width and 1.45 times length of 4th segment. Pronotum colored yellow-orange, covered with brown scales (may appear to have been rubbed off). Pronotum darkest along top of lateral lobes. FW's largely transparent, posterior margin (FW's

viewed together) with two dark spots, one at each corner; but each FW has only a single dark spot located at lateral corner. Lateral field dark ventrally, pale dorsally. File with 418 teeth. Legs I and II mostly pale with scattered brown scales. Femur III pale with longitudinal rows of light brown scales. Tibia III pale. Dorsum of abdomen dark, darkest near FW. Lateral edges of 10th tergite mostly pale. Genital processes black and slender. Cerci with scattered brown scales, becoming lighter posteriorly.

SONG. Fig. 323. Sequence of two-pulse chirps.

	p/s	ch/s	kps	°C
A-37	10.5	0.8	5.75	19.5

HABITAT. Tall grasses by roadside in rainforest clearing.

SPECIMENS. Holotype ♂ ANC. Lockerbie, Cape York, QLD (Monteith) 1♂ 1♀ UQC.

Maroa alawara n. sp.

RANGE. Type locality in northern coastal QLD.

RECOGNITION. Males: Head and pronotum brown. FW's with scattered dark markings. Abdomen dark brown. Genital processes nearly black. Hind femora pale with distal dark band. Frons with dark horizontal line above epistomal suture which curves upwards towards middle then forms network of dark marks on middle of frons. Dorsum of head with narrow dark band along transverse suture and behind antennal sockets. Area behind eyes with dark scales. Maxillary palpi: length of 5th segment 2.36 times its width and 1.48 times length of 4th segment. Pronotum brown, with pale narrow line running medially from front to back margin. Posterior edge and lateral surfaces of FW's dark brown; mirror with narrow brown band running along posterior vein. Lateral field of FW mostly dark, dorsal portion pale. File with 242 teeth. Femora I and II pale with light brown scales but distal end dark brown. Tibia III darker than femur, with two broad, faint brown bands. Dorsum of abdomen dark brown. Area between cerci no darker than area in front of cerci. Tenth tergite largely dark but with pale posterior projection next to base of each cercus. Venter of abdomen brown, becoming darker posteriorly, subgenital plate almost triangular and coming to a point. Genital processes dark brown, almost black. Cerci banded. Measurements in Table 37.

Females: Head colored as in male, pronotum brown with dark brown to black along lower edge of lateral lobes. Pronotal length 1.11 times length of head. Maxillary palpi: length of 5th segment 2.60 times its width and 1.77 times length of 4th segment. Legs marked as in male. Dorsum of abdomen nearly black. Tenth tergite similar to that in male with two lateral pale projections, otherwise dark between cerci. Ovipositor brown and almost straight (side view). Venter of abdomen dark brown. Subgenital plate with notch at posterior margin. Ovipositor 3.7 mm long and 2.19 times length of pronotum.

HOLOTYPE. ♂, A-4, Townsville, QLD, 21 vii 1968, ANC.

SONG. Fig. 323. Sequence of two-pulse chirps.

	p/s	ch/s	kps	°C
A-4 n=3	4.7–5.0	1.1–1.3	4.8	22
A-4	3.5	1.10	4.5	18

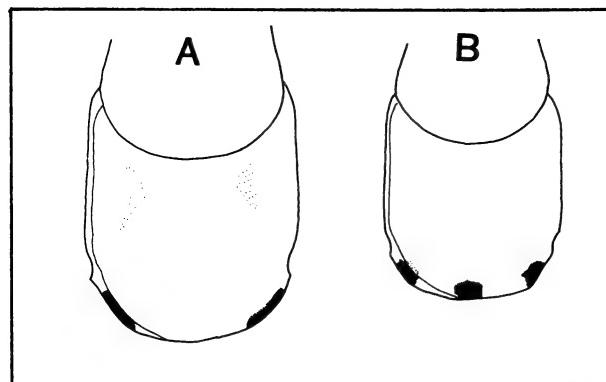


FIG. 330. *Maroa* FW's. A, *australicus*; B, *dardoana*.

HABITAT. Mangrove thickets.

SPECIMENS. Holotype ♂ ANC. A-4 1♂ 2♀ ANC.

Maroa indiwarra n. sp.

RANGE. Darwin area, NT.

RECOGNITION. Males: Most similar to *M. alawara* but lighter in color. Head and pronotum yellow to white. FW's largely dark but with central light area. Abdomen purple-brown, much darker than pronotum. Legs largely pale. Face with two lateral dark lines above epistomal suture which turn dorsally before reaching midline; horizontal band connecting them about halfway up frons; network of dark lines on either side of median line. Other dark marks in front of and below eyes, on pleurostoma, and on base of mandible. Horizontal stripe just below each antennal socket. Head behind eyes with dark scales extending to pronotum. Antennal scape with dark stripe along inner edge. Maxillary palpi brownish, darker than most of face, 5th segment with proximal and distal areas darkest, 4th and 3rd segments also brownish. Length of 5th segment 2.36 times its width and 1.65 times length of 4th segment. Pronotum uniformly yellowish, posterior edge with white scales. Posterior margin of FW's dark, preceded by milky white band which includes posterior mirror vein, this band preceded by another dark band inside posterior portion of mirror. Anterior part of FW's, from inside of mirror to pronotum, darkish. Region of chords milky white. Lateral field of FW's dark ventrally and milky white dorsally. File with 233 teeth. Femora I and II pale with light brown scales. Femur I with definite dark band close to distal end, particularly

TABLE 37. Body proportions in the species of *Maroa* (abbreviations as in Table 31).

		No. of file teeth	BL BW	PL FWL	HW RW	RW RL	FWL FWW	ML MW	BL (mm)	FL (mm)	CL (mm)
<i>dardoana</i>	H	474	3.15	1.19	2.64	1.94	0.89	0.96	7.4	3.8	4.5
<i>australicus</i>	E	418	3.17	1.24	2.92	2.09	0.87	0.98	9.0	4.5	7.1
<i>alawara</i>	H	242	—	1.00	3.19	1.71	0.95	0.98	—	4.7	—
	P♀	—	—	—	3.00	1.67	—	—	9.7	4.7	—
<i>indiwarra</i>	H	233	3.21	1.09	3.21	1.61	0.93	1.06	7.9	4.3	—

noticeable ventrally. Tibiae I and II with two fairly distinct broad brownish bands, one proximal and one more distal. Tarsi I and II light brown. Coxa II with dark mark on anterior face. Femur III very pale, with light brown scales, distal end with dark marks on top and bottom. Tibia III darker than femur, with faint bands. Dorsum of abdomen purple-brown in color, much darker than pronotum. Tenth tergite generally triangular, with rounded posterior edge, and two black lateral patches next to bases of cerci. Area between cerci approximately same color as area in front of cerci. Venter of abdomen considerably lighter than dorsum, becoming darker posteriorly. Subgenital plate brown. Genital processes dark brown to black. Cerci with pale background color and scattered brown scales. Measurements in Table 37.

HOLOTYPE. ♂, A-691, Darwin, NT, 24 ix 1968, ANC.

SONG. We believe song is succession of 2-pulsed chirps with pulse rate within pairs of 15 p/s at 27°C.

HABITAT. In mangroves along with *M. bandumu* and *M. kira*.

SPECIMENS. Holotype ♂ ANC.

LISTENING RECORDS. A-179? A-143.

M. iranda) are quite similar, yet these taxa are morphologically quite distinct. Recognizing the different morphotypes as distinct species will remain arbitrary until intervening regions are studied more intensively.

RECOGNITION. Small and slender; body length more than 3.5 times greatest body width. FW's relatively short, and 5th segment of maxillary palpi broad. Rostrum strongly produced (viewed from side—Fig. 333J) and indented along midline (viewed from above). Several species have prominent lines of dark or black scales along dorso-lateral angle of pronotum (Fig. 333J), and in most species pronotal disk darker than lateral lobes. Cerci banded in some species. Dorsal field of FW's variable—either largely darkened and unbanded, or with distinct poste-

TABLE 38. Comparison of the species of *Marinna*.

	Number of file teeth	Pronotum with dark scales along shoulder (Fig. 333J)	FW's entirely dark or with broad dark band across posterior end	Lateral surfaces of FW's with dark pigmentation	Dorsum of abdomen with a sudden transition from grey to black scales	Cerci with a band of dark scales centrally
<i>mira</i>	102	+	+	+	+	+
<i>bumboa</i>	84	+	—	—	+	+
<i>iranda</i>	91, 100	+	+	+	+	+
<i>ulandi</i>	102, 104	+	+	+	+	—
<i>jerrima</i>	95	+	+	+	+	—
<i>pangarinda</i>	92	—	—	—	—	—
<i>barinya</i>	200	—	—	—	+	—
<i>pallidus</i>	116	—	—	—	—	—
<i>arapala</i>	95	—	—	—	—	—
<i>ingorala</i>	195	—	—	—	—	—

MARINNA n. gen.

TYPE SPECIES: *Marinna jerrima* n. sp.

All species are from grasslands or open eucalypt woodland and were collected in north-central Queensland, Northern Territory and northern Western Australia.

The song of several species (*M. ulandi* and *M. bumboa*, of *M. jerrima*, *M. karka*, *M. warri*, and

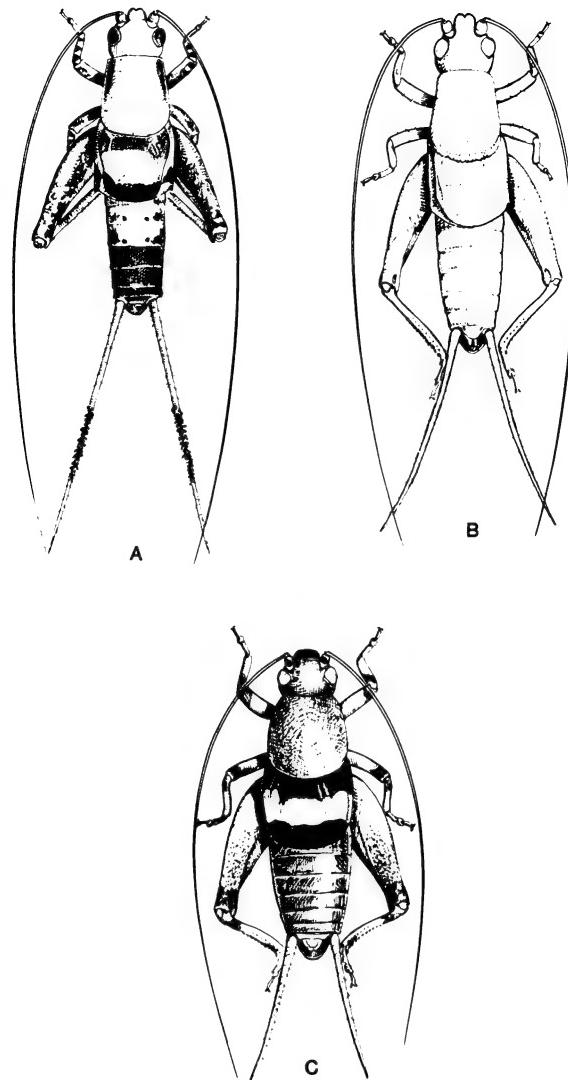


FIG. 331. A, *Marinna mira*; B, *Marinna arapala*; C, *Biama iloura*.

rior dark band, or largely pale and unbanded, but never with both an anterior and posterior dark band. Legs not strongly banded. In some species anterior abdominal tergites covered with light grey scales while posterior segments covered with black scales. Transition from grey to black scales abrupt. Genital processes black in all species except *M. ingoorala* and *M. arapala*, and 10th abdominal tergite lacks clumps of setae near center. Song of most species consists of complex chirps, but some species possess 2-pulsed songs.

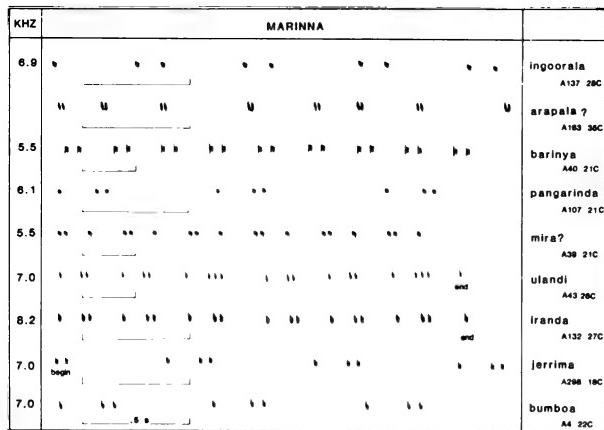


FIG. 332. *Marinna* songs. Scale = 0.5 s.

KEY TO *MARINNA* SPECIES (EXCEPT *PALLIDA*)

1. Cerci with prominent dark central band composed of dark scales (Fig. 333TUD') 2
- Cerci without central dark band composed of dark scales 4
2. FW's with dark pigmentation on lateral field, and with prominent dark band across posterior end (Fig. 333BCD) 3
- FW's pale on lateral field and posterior border only feebly pigmented (Fig. 333E-H). File with ca. 84 teeth *bumboa*
3. FW's strongly banded (Fig. 331A). File with ca. 100 teeth *mira*
FW's quite dark (Fig. 333A) but not strongly banded.
File with ca. 90 teeth *iranda*
4. Body color pale, yellowish, without dark markings. Genital processes light brown or pale 5
- Body with prominent dark areas. Genital processes dark brown or black 6
5. FW's as long as exposed abdomen. File with ca. 195 teeth *ingooralia*
FW's clearly shorter than exposed abdomen. File with ca. 95 teeth *arapala*
6. Cerci largely pale 7
- Cerci largely dark 9
7. Lateral surface of FW's dark, and posterior section of FW's with prominent dark band. Pronotum with line of dark scales at edge of disk *ulandi*
Not fitting above description 8
8. Anterior tergites of abdomen with grey scales, posterior tergites with black scales and with the transition between light and dark scales abrupt. File with ca. 200 teeth *barinya*
Dorsum of abdomen without strong transition from light to dark scales. File with ca. 92 teeth *pangarinda*
9. FW's with prominent dark band across posterior section and dark pigmentation on lateral field. Dorsum of abdomen with sudden transition from pale to dark scales *jerrima*

TABLE 39. Body proportions in *Marinna* species (abbreviations in Table 31).

		No. file teeth	PL FWL	FWL AL	RW SW	FWL FWW	ML MW	BL (mm)	FL (mm)
<i>jerrima</i>	H	95	1.31	0.80	2.00	0.82	0.96	5.5	3.0
	P♀	—	—	—	1.92	—	—	6.7	3.3
<i>mira</i>	H	102	1.25	0.67	1.64	0.82	0.96	6.1	2.9
	H	84	1.24	1.03	2.00	0.85	0.92	6.9	2.8
<i>bumboa</i>	H	—	—	—	—	—	—	—	—
	P♂	—	—	—	—	—	—	—	—
<i>iranda</i>	H	91, 100	1.15	0.85	1.73	0.94	1.00	5.4	2.5
<i>ulandi</i>	H	102, 104	1.22	1.19	1.54	0.88	1.00	6.9	3.2
A-40	P♂	—	—	—	—	—	—	—	—
A-43	P♀	—	—	—	—	—	—	—	—
<i>pangarinda</i>	H	92	1.16	0.83	1.69	0.95	1.00	6.3	3.2
	P♂	—	—	—	—	—	—	—	—
	P♀	—	—	—	—	—	—	—	—
	P♀	—	—	—	—	—	—	—	—
<i>pallida</i>	E	116	1.21	0.58	1.57	0.95	1.40	7.5	3.5
<i>ingooralia</i>	H	195	1.10	1.14	1.64	1.04	1.19	7.1	3.7
<i>barinya</i>	H	200	1.54	0.55	1.31	0.74	0.97	7.3	3.7
<i>arapala</i>	H	95	1.19	0.57	1.54	0.92	1.08	6.8	3.1
A-163	P♂	—	—	—	—	—	—	—	—
A-163	P♂	—	—	—	—	—	—	—	—

FW's feebly pigmented across posterior margin and pale on lateral field. Dorsum of abdomen without sudden transition from light to dark scales *karawinta*

Marinna jerrima n. sp., Fig. 333CDOC'G'

RANGE. Type locality in southcentral coastal QLD.

RECOGNITION. Males: Abdomen and legs dark brown. Pronotum and head yellowish, face dark. Dorsum of head yellowish. Face dark, nearly black. Side of head nearly black at lower margin. Maxillary palpi: 2nd, 3rd, and 4th segments with horizontal dark streak on top; 5th segment with brown ring around distal end. Length of 5th segment 1.70 times its width and 1.42 times length of 4th segment. Pronotal disk with four small dark spots in anterior half, two in each anterior quarter. Scales on pronotal disk mostly pale but a few darker scales located at lateral margin. Lateral lobes lighter than disk. FW's as in Fig. 333C. File with 95 teeth. Femora I and II with brown background color and covered with darker scales. All tarsi lighter than tibiae, but 3rd segment brown. Femur III with dark brown background color, covered with black scales. Tibia III light brown with brown to black scales. Tenth tergite of abdomen with pronounced lateral processes as in Fig. 333O. Subgenital plate somewhat

pointed. Venter of abdomen dark, last three sternites nearly black. Genital processes black. Cerci dark brown becoming lighter near distal end. Measurements in Table 39.

Females: Head and pronotum yellow with brown marks, abdomen largely black, especially in middle section. Dorsum of head with dark scales behind eyes and with faint longitudinal lines between these lateral dark patches. Area just behind transverse suture dark. Rostrum with dark medial sulcus and dark lateral surfaces. Face pale, almost white. Side of head yellowish, with row of dark scales between eyes and lower margin. Lateral lobes of pronotum pale; disk of pronotum with two oval dark rings, and two broad patches in each posterior quarter. Legs with pale background and thick covering of dark scales on the femora and tibiae. First few tergites of abdomen pale centrally and with lateral dark spots. Central abdominal tergites nearly black. Last three tergites lighter and with dark spots. Tenth tergite with lateral dark brown streaks. Sternum dark brown. Subgenital plate not indented. Cerci brownish, thick proximally, slender distally (Fig. 333G'). Ovipositor 3.3 mm long and 2.67 times as long as pronotum.

HOLOTYPE. ♂, A-298, Rockhampton, QLD, 6 xi 1968, ANC.

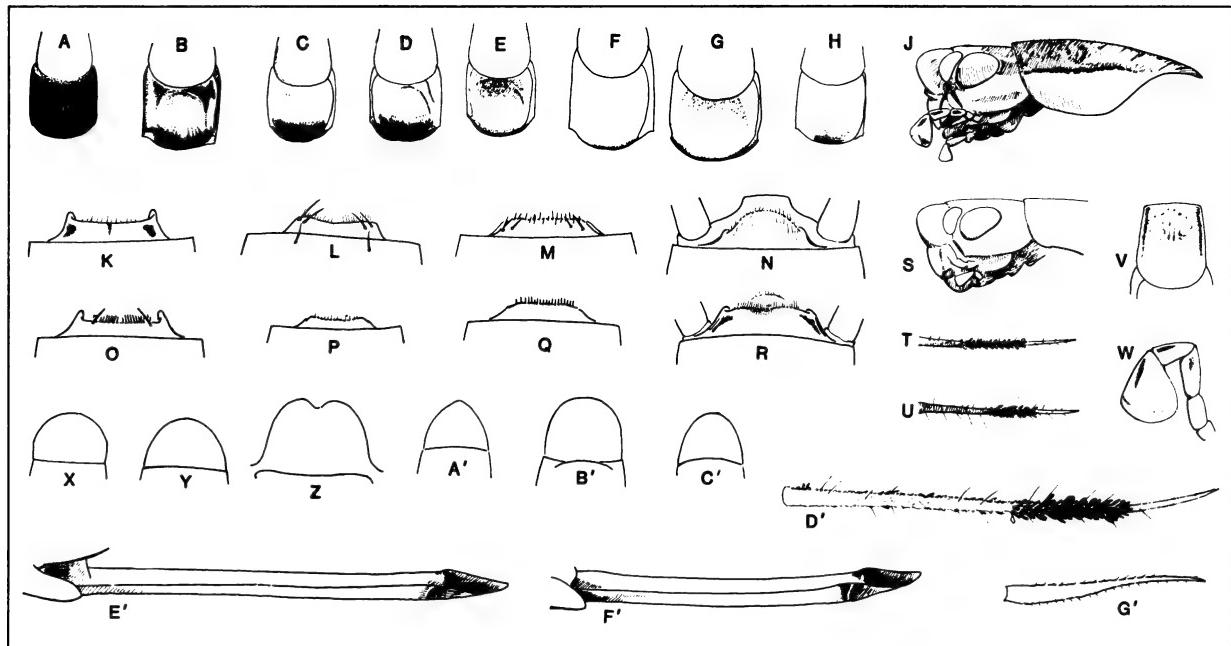


FIG. 333. *Marinna*. A–H, FW's: A, *iranda*; B, *ulandi*; C, *jerrima*; D, *jerrima*; E, *pangarinda*; F, *pallida*; G, *barinya*; H, *bumboa*. J, *pallida*. K–R, 10th abdominal tergites: K, *pangarinda*; L, *ulandi*; M, *bumboa*; N, *ingooralia*; O, *jerrima*; P, *iranda*; Q, *iranda*; R, *pallida*. S, head of *arapala*; T, cercus of *pangarinda*; U, cercus of *iranda*; V, pronotum of *pallida*; W, max. palpus of *arapala*. X–C', male subgenital plates: X, *bumboa*; Y, *ulandi*; Z, *ulandi* female; A', *pangarinda*; B', *barinya*; C', *jerrima*. D', cercus of *mira*; E', *ulandi* ovipositor; F', *pangarinda* ovipositor; G', *jerrima* cercus.

SONG. Fig. 332. Single pulse followed by two-pulse unit.

	p/s				
	A	B	ch/s	kps	°C
A-298	22.2	6.7	1.5	7.0	18

HABITAT. Grasses in open eucalyptus woodland.

SPECIMENS. Holotype ♂ ANC. A-298 1♀ ANC.

Marinna mira n. sp., Figs. 331A, 333D'

RANGE. Type locality in eastern central Cape York Peninsula.

RECOGNITION. Males: Head and pronotum yellowish, pronotum with row of dark scales along edge of disk. FW's banded as in Fig. 331A. Posterior part of abdomen darker than anterior part. Head mostly yellowish, but with slight concentration of darker scales behind eyes. Face with fine network of reddish lines on frons. Maxillary palpi: 3rd, 4th, and 5th segments with marks on dorsal surface; 5th segment with dark ring around distal

end; length of 5th segment 1.55 times its width and 1.55 times length of 4th segment. Pronotum yellowish, lateral margins of disk with row of dark scales; posterior margin with white scales. Lateral lobe paler than disk. Lateral field of FW dark ventrally. File with 102 teeth. Femora I and II with dark scales on upper and outer faces; these dark areas contain light spots within them. Tibiae I and II with three dark bands—two in proximal half and one in distal half. Femur III with dark brown scales on all surfaces; on upper face there are pale spots within the dark areas. Abdominal tergites 7, 8, 9, and 10 dark and mostly covered with black scales. Tenth tergite dark, nearly black posteriorly—shape as in *M. iranda* (Fig. 333P). Lateral surface of abdomen dark posteriorly beginning at the 7th segment. Venter of abdomen with last three segments black; more anterior segments with grey or silvery scales. Subgenital plate broadly rounded. Genital processes black. Measurements in Table 39.

HOLOTYPE. ♂, A-40, 10.5 miles north of Musgrave, Cape York, QLD, 11 viii 1968, ANC.

SONG. Not known.

HABITAT. Found near ground in grass and leaf litter in open eucalyptus woodland.

SPECIMENS. Holotype ♂ ANC.

Marinna bumboa n. sp., Fig. 333HMX

RANGE. Type locality in central coastal QLD.

RECOGNITION. Males: Most similar to *M. jerrima*. Head, pronotum and FW's very pale brown. Dorsum of head pale, with black band behind each eye; area between these dark bands pale. Maxillary palpi marked as in *M. karawinta*; length of 5th segment 1.63 times its width and 1.80 times length of 4th segment. Pronotum same color as head but with prominent lines of dark scales along edge of disk. Lateral lobes lighter than dorsal surface. Disk without the distinct patterning as in *M. karawinta*. FW's with pale brown patches inside mirror (Fig. 333H). Lateral surface of FW entirely pale. File with 84 teeth. Femora I and II with brown background color and with dark brown scales on the outer face. Tibiae I and II pale with brownish scales arranged in faint transverse bands, and with dark line of scales along dorsal surface. Tarsi I and II mostly pale, 3rd segment dark brown distally. Femur III light brown, with dark brown scales on outer, upper and inner faces; distal top extremity white. Tibia III pale with dark scales between serrations and with a patch of scales in anterior proximal region. Dorsum of abdomen brown to dark brown; mostly covered with dark scales in last four or five segments; mostly covered with grey scales in more anterior tergites; each tergite with four patches of dark scales, two lateral ones and two more central ones. Tenth tergite nearly black (Fig. 333M). Venter of abdomen with last three segments nearly black, covered with black scales; more anterior segments covered with grey scales; transition from grey to dark scales sudden. Lateral surface of abdomen with black scales posteriorly, and grey scales anteriorly; in anterior region small rings of dark scales surround each spiracle. Subgenital plate broadly rounded (Fig. 333X). Genital processes black. Cerci banded: 1st quarter pale, 2nd and 3rd quarters dark brown with brownish scales, 4th quarter mainly pale. Measurements in Table 39.

HOLOTYPE. ♂, A-4, Townsville, QLD, 21 vii 1968, ANC.

SONG. Fig. 332. Song taped where this species was collected, and presumed to belong to this

species, consists of groups of complex chirps. Apparently first chirp always comprises double-pulse unit; 4–5 chirps in each group, and groups of chirps spaced by interval of 5 s.

	p/s		ch/s	kps	°C
	A	B			
A-4	19.6	5.3	1.3	7.0	22
A-4	20.0	5.3	1.4	6.9	18

HABITAT. Dry grassland on dunes behind beach.

SPECIMENS. Holotype ♂ ANC. A-4 1♂ ANC. A-765 1♂ ANSP.

Marinna iranda n. sp., Fig. 333APQU

RANGE. Northern and northwestern NT.

RECOGNITION. Males: Head and pronotum yellow. FW's dark brown to black. Abdomen black in distal half. Head yellowish on top, and with black scales behind eyes and on scape. Face orange with network of reddish lines on frons. Maxillary palpi mostly brown with dark brown dorsal streak on 3rd, 4th, and 5th segments, darkest on the 4th; length of 5th segment 1.50 times its width and 1.36 times length of 4th segment. Pronotum yellow-brown, with row of dark scales at edge of disk in anterior region. Transition sudden from darker scales of disk to lighter scales of lateral lobes. Posterior margin of disk with white scales. FW's dark brown to black on dorsal surface. Mirror slightly lighter centrally. Lateral field of FW's almost entirely dark. File with 91, 100 teeth (n=2). Femora I and II light brown with black scales on upper and outer faces. Tibiae I and II brown and unbanded. Femur III brown to dark brown in background color, and covered with both black and grey scales; outer face nearly uniformly covered with dark scales. Tibia III brown and with dark scales. Tarsus III lighter than tibia. Last four tergites of abdomen before cerci brown and covered with black scales. More anterior tergites lighter and with grey scales—10th tergite dark brown. Lateral surface of abdomen covered with scales in anterior portion (anterior to 6th tergite), and covered with black scales posteriorly. Last three segments of sternum black, more anterior segments covered with grey scales. Genital processes dark brown. Cerci with thick covering of black scales in 3rd 1/4 and mostly white in the 4th 1/4 (Fig. 333P). Measurements in Table 39.

HOLOTYPE. ♂, A-132, nr. Darwin, NT, 25 ix 1968, ANC.

SONG. Fig. 332. 4–6 complex chirps/group; chirps consisting of pairs of pulses followed by single pulses. We watched a pair of this species find one another and copulate. The male was singing about two feet off the ground in a small bush. Between songs he ran along the stems and branches of the plant, moving approximately six inches laterally, the same downward, then returning. He would make several runs more or less in the same direction, then return to his original location. On his third return during our observations, we saw a female we had not seen before perched near the spot where we had originally seen the male. It seems likely she had approached this spot while he was a few inches down the stem, for upon approaching to within an inch or two, but prior to antennal or other contact, the male seemed to increase his speed of running and soon touched the female. This change in behavior may have resulted from odors in the air or on the substrate. Within a second following contact he had run underneath the female from behind and connected the genitalia. The pair then became motionless except for occasional pumping movements. After 5 minutes they separated, the male running out from under the female. Then the male briefly contacted the female's genitalia with his mouth parts. The female darted away and appeared to eat the spermatophore. The pair was captured.

	p/s				
	A	B	ch/s	kps	°C
A-132	33.3	—	3.3	8.2	27
A-163 n=2	35.7, 40.0	9.1	3.4	8.8	30
A-164	37.0	8.7	3.9	8.5	30
A-175	33.0	7.8	2.9	7.6	26
A-253	33.3	9.3	3.2	7.6	26

HABITAT. In woody shrubs behind beach.

SPECIMENS. Holotype ♂ ANC. A-132 1♂ ANC. A-153 1♂ ANC. A-163 1♂ ANSP.

LISTENING RECORDS. A-152.

Marinna ulandi n. sp., Fig. 333BLYZE'

RANGE. Type locality in northern Cape York Peninsula.

RECOGNITION. Males: Quite similar to *M. jerrima*. Head and pronotum yellowish. Abdomen

brown. FW's as in Fig. 333B. Head yellowish with dark scales concentrated behind eyes. Remaining portion of top of head pale. Face mostly pale but with network of brown lines on frons. Maxillary palpi without dark horizontal marks, but 5th segment with brown ring around distal margin; length of 5th segment 1.47 times its width and 1.69 times length of 4th segment. Disk of pronotum slightly darker than lateral lobes; transition from darker to lighter scales at edge of disk sudden and marked by row of dark brown scales. Posterior margin with white scales. Lateral field of FW's almost entirely dark. File 102, 104 teeth (n=2). Femur I with scattered brown scales on upper and outer faces. Femur II with scales arranged in two bands. Tibiae I and II mostly pale. Tibia II with two somewhat indistinct patches of dark scales, one in distal half and one in proximal half. Femur III with light brown scales on upper and outer faces. Tibia III mostly pale but with a few dark scales between serrations. Dorsum of abdomen brown, slightly darker distally, but without sudden transition from lighter to darker tergites. Tenth tergite (Fig. 333L) with prominent bristles laterally. Venter of abdomen with grey scales, about same color as dorsum. Subgenital plate broadly rounded. Genital processes nearly black. Cerci broken distally but probably pale throughout. Measurements in Table 39.

VARIATION. male from A-40 (song unknown) similar to the type except line of dark scales along dorso-lateral margin more distinct, and cerci distinctly banded.

HOLOTYPE. ♂, A-43, 61 miles north of Coen on Kennedy Highway, QLD, 11–15 viii 1968, ANC.

SONG. Fig. 332. Very similar to that of *M. bumboea*, but lengths of intervals different. Consists of complex chirps comprising single-pulse followed by double- or triple-pulse unit.

	p/s				
	A	B	ch/s	kps	°C
A-43	20.0	4.8	1.72	7	28

HABITAT. Grass and leaf litter in open woodland.

SPECIMENS. Holotype ♂ ANC. A-43 1♀ ANC.

Marinna pangarinda n. sp., Fig. 333EKTA'F'

RANGE. Type locality in central NT.

RECOGNITION. Males: Head, pronotum, FW's, and hind femora mostly yellow; abdomen brown, much darker than head and pronotum. Dorsum of head yellowish. Face nearly white. Scape brown, much darker than top of head. Area behind eyes with darker scales. Maxillary palpi: 3rd segment with distal and proximal dark spots on external surface; 4th segment with prominent line on dorsal surface; 5th segment with proximal dark mark and dark ring around distal end (ring interrupted on outer face). Length of 5th segment 1.33 (1.20 in a paratype) times its width and 1.67 (1.50) times length of 4th segment. Pronotum yellowish; but scales rubbed off. FW's entirely pale, including lateral field. File with 92 teeth. Femora I and II with pale background and dark brown scales on outer and distal dorsal surface. Tibiae I and II with 3 dark bands, most pronounced on upper face. Femur III pale with brown scales, now mostly rubbed off; and with ring of brown pigmentation around distal portion of femur. Tibia III with line of dark scales between serrations, darkest near distal end. Dorsum of abdomen brown with four somewhat indistinct dark spots on each tergite, except 9th which has only two central spots. Tenth tergite with prominent lateral projections. Venter of abdomen much lighter than dorsum and covered with grey scales throughout. Each sternite (except last) with four small spots. Subgenital plate broadly rounded with small dark spot at distal extremity. Genital processes dark brown and pointed. Cerci mostly pale, almost white in distal quarter. Measurements in Table 39.

Females: Posterior and posterior lateral margins of pronotal disk brown. Legs marked as in male. Each abdominal tergite dark laterally. Posteriorly tergites become progressively darker in central region; 6th tergite almost entirely black. Posterior to the 6th tergite the light central area becomes broader again. Sternum covered with grey scales; each sternite with small, somewhat indistinct dark spots. Subgenital plate not indented at posterior extremity. Ovipositor 3.8 mm and 2.50 (2.39) times pronotal length. Cerci brownish in first $\frac{3}{4}$ and becoming nearly black distally.

HOLOTYPE. ♂, A-107, 73 mi north of Tennant Creek, NT, 21 ix 1968, ANC.

SONG. Fig. 332. Similar to that of *M. bumboa* but differs slightly in rates.

	n=2	p/s		ch/s	kps	°C
		A	B			
A-107		22.2, 27.0	5.6	1.6	6.0, 6.1	21

HABITAT. Open, lightly wooded grassland.

SPECIMENS. Holotype ♂, ANC. A-107 1♂ 2♀ ANC.

***Marinna pallida* (Chopard), Fig. 333FJRV**

Liphoplus pallidus Chopard 1925: 23. Holotype ♂, Herberton, QLD, sm. Transferred to *Ornebius* by Chopard 1951: 438. Type examined.

Liphoplus griseus Chopard 1925: 25. Holotype ♀, Cape York, QLD, sm. Synonymized by Chopard 1951. Type examined.

RANGE. Northcentral coastal QLD.

RECOGNITION. Males: (based on male from A-270). Body color light brown. FW's pale. Pronotum with two distinct lateral dark lines. Dorsum of head with broad darker bands behind each eye and two still broader dark bands between these lateral bands. Side of face with narrow dark band. Posterior margin of antennal sockets brown. Rostrum with brown lateral surfaces. Scape segments dark brown. Frons very pale. Maxillary palpi marked as in *M. arapala*. Length of 5th segment 1.50 times its width and 1.50 times length of 4th. Lateral lobes of pronotum very pale, disk light brown, but lateral margins with narrow row of black scales (Fig. 333V) and with several darker patterns anteriorly. FW's mostly pale, but distal extremity slightly brown near center. File with 116 file teeth. Femora I and II with brown scales on upper and outer faces. Tibiae brownish with narrow line of black scales along entire upper face. Femur III with brown scales on upper and outer faces, arranged into fairly broad longitudinal bands; distal end somewhat darkly pigmented. Tibia III brown, and with row of black scales running length of tibia between serrations. Dorsum of abdomen brown, darker than head and pronotum. Each tergite appears to have possessed dark patches of scales (now rubbed off) as in *M. arapala*. Tenth tergite with lateral dark spots (Fig. 333R). Sternum light brown. Subgenital plate broadly rounded. Genital processes pointed and black. Cerci brown, with extreme tip pale. Measurements in Table 39.

SONG. Not known.

HABITAT. Collected in grass and leaf litter in open eucalypt woodland west of Paluma, QLD.

SPECIMENS. Holotype ♂ SM. Cape York, QLD, 1♀ SM. A-270
1♂ ANC.

Marinna ingooralia n. sp., Fig. 333N

RANGE. Type locality in northern NT.

RECOGNITION. Males: Body color very pale, without any dark markings. Head very pale. Maxillary palpi: 5th segment 2.00 times its width and 1.18 times length of 4th segment. Pronotum very pale; lacking sudden transition from darker to lighter scales at edge of pronotal disk. FW's entirely pale, and relatively long (Table 39). File with 195 teeth. Legs very pale; tibiae without dorsal dark stripe. Dorsum of abdomen slightly darker than pronotum. Each tergite with 4 very small dark spots, two lateral ones and two more central ones. Tenth tergite as in Fig. 333N. Sternum very pale. Subgenital plate somewhat angular. Genital processes pointed and yellowish. Cerci mostly missing; remaining portion pale. Measurements in Table 39.

HOLOTYPE. ♂, A-137, 45 miles east of Adelaide River, NT, 26 ix 1968, ANC.

SONG. Fig. 332. Succession of double-pulse chirps. Male taped at A-218 not caught.

	p/s	ch/s	kps	°C
A-137 n=2	7.7, 8.3	1.9, 2.0	6.9, 7.2	28
?A-218	10.0	1.8	—	32

HABITAT. Grasses and leaf litter in open eucalyptus woodland.

SPECIMENS. Holotype ♂ ANC.

Marinna barinya n. sp., Fig. 333GB'

RANGE. Type locality in eastcentral Cape York Peninsula.

RECOGNITION. Males: Head, pronotum, and legs mostly yellowish; abdomen brown, last two segments dark brown. Head yellowish, slightly orange. Scape no darker than top of head. Without dark scales behind eyes. Face quite pale, side of face orange. Maxillary palpi without dark streaks dorsally; 5th segment with dark ring around distal end. Length of 5th segment 1.92 times its width and 1.39 times length of 4th segment. Pronotum yellow with dense mass of light brown scales near anterior corners of disk. Lateral lobes pale, without sudden transition from darker disk to lighter lateral lobes.

Posterior margin with light scales. Posterior margin of FW's with light brown band; region around anterior mirror vein also brown (Fig. 333G). Lateral surface of FW's entirely pale. File with 200 teeth. Femora I and II very pale with brown scales scattered on external surface. Tibiae I and II with line of dark scales along dorsal surface. Femur III pale on ventral two-thirds of outer face; dorsal third with dark scales; distal region encircled with dark scales. Tibia III mostly pale with scattered light brown scales. Abdominal tergites 8, 9, and 10 with dark brown scales; more anterior tergites with light scales; transition between light and dark tergites sudden. Sternum mostly light brown; each sternite with four small dark spots. Subgenital plate with rounded posteriors, and considerably darker than previous segments (Fig. 333B'). Genital processes black. Cerci pale throughout. Measurements in Table 39.

HOLOTYPE. ♂, A-40, 101 miles north of Laura, QLD, 10 viii 1968, ANC.

SONG. Fig. 332. Succession of 2-pulse chirps. One song contained 23 chirps, another 9 chirps.

	p/s	ch/s	kps	°C
A-40	8.6	2.6	5.5	21

HABITAT. Sang at night in low, dry grasses in open eucalyptus grassland.

SPECIMENS. Holotype ♂ ANC.

Marinna arapala n. sp., Fig. 333SW

RANGE. North-northwestern NT.

RECOGNITION. Males: Body color pale, yellowish. FW's entirely pale. Occiput with faint longitudinal dark lines. Face entirely very pale. Maxillary palpi: 5th segment very broad; 3rd, 4th, and 5th segments with dark line on dorsal surface, 5th segment with several additional dark marks around distal margin. Length of 5th segment 1.20–1.36 times its width and 1.50–1.58 times length of 4th segment. Pronotum pale. Disk slightly darker than lateral lobes and with sudden transition from darker scales to lighter scales at edge of disk. FW's without dark markings. File with 95 teeth. Femora I and II very pale with yellowish scales. Tibiae I, II, and III mostly pale, but with distinct line of black scales on dorsal surface extending from proximal to distal

end. Femur III with yellow scales arranged in broad longitudinal lines on dorsal surface. Tarsus III pale; 1st segment with dense arrangement of setae on ventral surface. Dorsum of abdomen light brown, but darker than pronotum; each tergite (except 9th and 10th) with four faint dark spots, two lateral and two medial; 9th tergite with reddish brown posterior central margin; 10th tergite with distinct lateral reddish marks. Venter of abdomen pale, subgenital plate broadly rounded. Genital processes pointed and yellowish. Cerci pale throughout. Measurements in Table 39.

VARIATION. Two paratypic males from A-163 are similar to holotype and also have 95 file teeth. But they differ as follows: patch of dark scales next to pronotum behind eyes; femora I and II with dark brown scales on outer and upper faces; lateral surface of antennal scape with patch of dark scales; dorsum of abdomen with small patch of dark scales (4 to each tergite except 9th which has 2 and 10th which has none). Lateral patches more prominent. In one male there is a sudden transition from slightly darker pronotal disk to lighter lateral lobes. Dark spots on tergum appear to be rubbed off.

HOLOTYPE. ♂, A-163, 25 miles west of Katherine, NT, 30 ix 1968, ANC.

SONG. Not known with certainty. Fig. 332 may represent song of this species.

HABITAT. Found among grasses in open savanna country.

SPECIMENS. Holotype ♂ ANC. A-163 1♂ ANC. A-170 1♂ ANC.

BIAMA n. gen.

TYPE SPECIES: *Biama noccundra* n. sp.

The members of this genus occur in the dry interior of Australia and are usually found on or near the ground, and sometimes under spinifex grass.

RECOGNITION. Fig. 331C. These are small species with body length less than 7 mm. In both sexes palpi very long and slender (Fig. 336DE). Length of fifth segment of maxillary palp varies from 2.5 times to 4.4 times its greatest width. Rostrum much wider than scape varying from 2.17 to 2.89 times as wide. Pronotum (top view) with convex lateral margins, especially in males (Fig. 331C). This convexity less pronounced in *B. arila*. Head usually reddish,

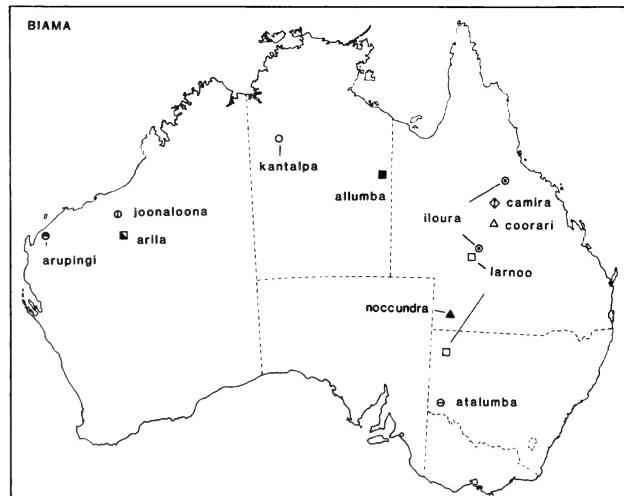
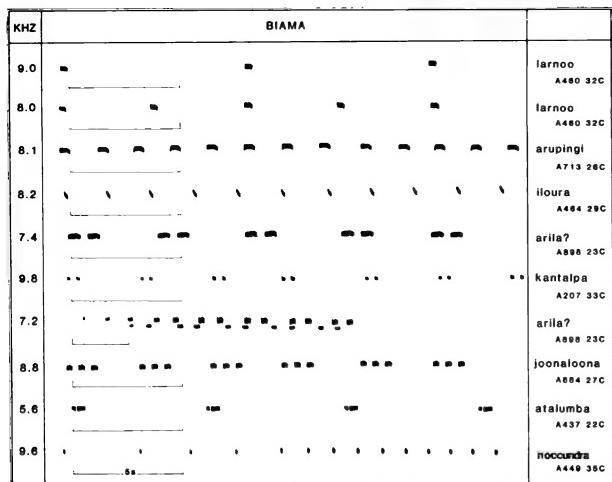


FIG. 334. Distributions of *Biama* species.

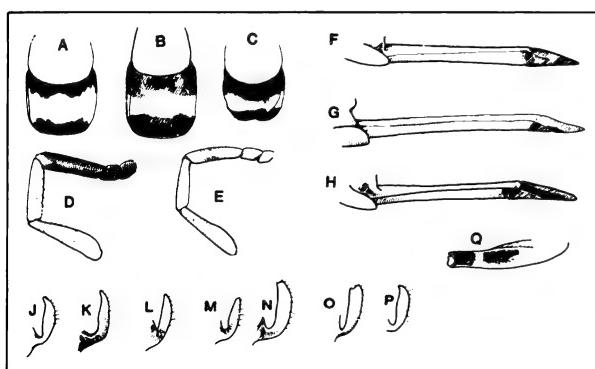
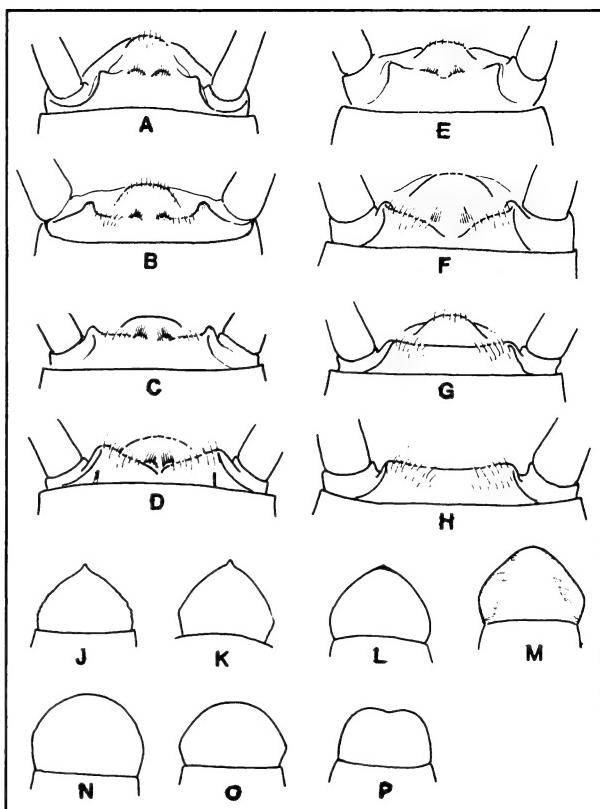
pronotum usually yellowish, hind femora frequently with large patch of dark scales on dorsal face. Cerci unbanded. FW's with both anterior and posterior transverse dark bands. Lateral field of each FW partly pigmented. Genital processes pale brown, but sometimes black near base. In females distal margin of subgenital plate indented and ovipositor as shown in Fig. 336FGH.

KEY TO BIAMA SPECIES

1. Head and pronotum dark brown. Legs darkly pigmented, nearly black. File with about 412 teeth *arila*
- Head and pronotum not dark brown, usually reddish. Pronotum yellowish. Legs pale but may be partially covered with dark scales 2
2. Pronotum at least 1.4 times as long as exposed FW 4
- Pronotum less than 1.3 times as long as exposed FW 3
3. Length of 5th segment of maxillary palpi approximately 4.0 times its greatest width. File with about 161 file teeth *iloura*
- Length of 5th segment of maxillary palpi less than 3.3 times its greatest width 7
4. Transparent band on FW's not any wider than posterior dark band. Pronotum at least 1.8 times as long as exposed FW 5
- Transparent band on FW's distinctly wider than (approximately 2 times as wide as) the posterior dark band. Pronotum less than 1.6 times as long as exposed FW 6
5. Length of 5th segment of maxillary palpi more than 4.2 times its greatest width. Length of FW less than 0.6 times its width. File with 224 teeth *kantalpa*
- Length of 5th segment of maxillary palpi no more than 4.0 times its greatest width. Length of FW at least 0.7 times its width. File with ca. 313 teeth ... *joonaloona*

FIG. 335. Songs of *Biama* species. Scale = 0.5 s.

6. Body length less than 6.0 mm. Mirror longer than wide. Length of 5th segment of maxillary palpi less than 4.2 times its greatest width. File with ca. 182 teeth *allumba*
 Body length more than 6.5 mm. Mirror wider than long. 5th segment of maxillary palpi more than 4.5 times its greatest width. File with ca. 289 teeth *camira*
7. Length of FW's more than 1.5 times length of exposed abdomen. File with ca. 347 teeth *atalumba*
 Length of FW's equal to or less than length of exposed abdomen 8
8. Transparent band of FW's distinctly wider than posterior dark band. Subgenital plate rounded posteriorly. Posterior margin of 10th tergite without 2 tufts of setae near center (Fig. 337H). File with ca. 147 teeth *noccundra*
 Transparent band of FW's not any wider than posterior dark band. Subgenital plate somewhat pointed or angulate posteriorly. Posterior margin of 10th tergite with two tufts of setae near center 9

FIG. 336. *Biama*. A, *camira* FW's; B, *larnoo* FW's; C, *kalntalpa* FW's; D, max. palp of *arila*; E, max. palp of *kalntalpa*; F, *larnoo* ovipositor; G, *arila* ovipositor; H, *iloura* ovipositor. J-P, male genital processes: J, *arupingi*; K, *kalntalpa*; L, *iloura*; M, *iloura*; N, *camira*; O, *allumba*; P, *arila*. Q, dorsum of *noccundra* hind femur.FIG. 337. *Biama*. A-H, 10th tergite of abdomen: A, *kalntalpa*; B, *arila*; C, *joonaloona*; D, *allumba*; E, *arupingi*; F, *camira*; G, *iloura*; H, *noccundra*. J-O, male subgenital plates: J, *arila*; K, *kalntalpa*; L, *allumba*; M, *larnoo*; N, *noccundra*; O, *iloura*. P, female subgenital plate of *iloura*.

- tae near center (Fig. 337H). File with ca. 147 teeth *noccundra*
 Transparent band of FW's not any wider than posterior dark band. Subgenital plate somewhat pointed or angulate posteriorly. Posterior margin of 10th tergite with two tufts of setae near center 9
9. Length of FW's nearly equal to length of exposed abdomen (at least 0.95 times abdominal length). Rostral width not more than 1.85 times its length 10
 Length of FW's distinctly shorter than exposed abdomen (less than 0.8 times abdominal length). Rostral width at least 2.0 times rostral length. File with ca. 325 teeth *larnoo*
10. Pronotal length more than 1.1 times length of FW's. Head width less than 2.2 times width of rostrum. Rostral width more than 2.7 times width of scape. File with ca. 395 teeth *arupingi*
 Pronotal length equal to length of FW's. Head width more than 2.3 times width of rostrum. Rostral width less than 2.5 times width of scape. File with ca. 197 teeth *coorari*

TABLE 40. Comparison of *Biama* species.

	Number of file teeth	First 2 or 3 segments of maxillary palpi reddish (vs. pale)	Pale tegminal band distinctly wider than posterior dark band	Tegmina distinctly shorter than exposed abdomen	Pronotal length 50% or more longer than exposed tegmina	Subgenital plate rounded (vs. pointed or angulate)	Body length less than 6.0 mm	10th tergite of abdomen with two tufts of setae near center margin	Head reddish, pronotum yellowish (vs. same color)
<i>allumba</i>	182	-	+	+	-	+	+	+	+
<i>kantalpa</i>	224	-	-	+	+	-	+	+	+
<i>noccundra</i>	147	-	+	+	-	+	-	-	-
<i>iloura</i>	161	-	-	+	-	+	-	-	+
<i>camira</i>	289	-	+	+	+	+	-	+	+
<i>arupingi</i>	395	+	-	-	-	-	+	+	+
<i>arila</i>	412	+	-	+	-	-	+	+	-
<i>larnoo</i>	325	+	-	+	-	-	-	+	+
<i>joonaloona</i>	313	+	-	+	+	-	-	+	-
<i>coorari</i>	197	+	-	-	-	-	+	+	+
<i>atalumbia</i>	347	-	-	-	-	-	+	+	-

Biama noccundra n. sp., Figs. 336Q, 337HN

RANGE. Type locality in extreme southwestern QLD.

RECOGNITION. Males: Small, yellowish pronotum. Head yellowish, with 6 faint longitudinal lines on occiput—the most lateral ones behind eyes. Face pale, suture dividing rostrum black. Maxillary palpi: length of 5th segment 3.28 (3.14) times its width and 1.28 (1.22) times length of 4th. Pronotum yellowish, without dark scales on lateral lobes. Pale band of FW wider than either anterior or posterior dark bands. Posterior dark band darker than anterior dark band. File with 147 teeth. Femora I and II very pale, with a few dark scales near the distal end. Tibiae I and II very pale. Femur III with nearly white outer face and encircling ring of dark scales about two tibial diameters from distal end; anterior to this dark ring is a dark patch of scales on dorsal face (Fig. 336Q). Tibiae III pale. Dorsum of abdomen brown, slightly darker than head and prono-

tum. Tenth tergite as in Fig. 337H. Sternum very pale. Subgenital plate mostly pale, but with patch of darker scales along posterio-lateral edge; rounded posteriorly. Cerci very pale proximally, acquiring somewhat darker scales distally. Measurements in Table 41.

HOLOTYPE. ♂, A-449, nr. Noccundra, QLD, 13 ii 1969, ANC.

SONG. Fig. 335. Succession of widely spaced pulses in which rate accelerates gradually beginning at about 4–5/s and finishing at 10–12/s at 36°C.

HABITAT. Mulga woodland, in leaf litter.

SPECIMENS. Holotype ♂ ANC. A-449 1♂ ANC.

Biama larnoo n. sp., Figs. 336BF, 337M

RANGE. Central QLD.

RECOGNITION. Males: Pronotum yellowish, head reddish, abdomen brown, last two tergites before cerci distinctly darker. Head reddish. First three segments of maxillary palpi pinkish in color, distal three segments white. Length of 5th segment 2.86, 2.57 times its width and 1.25, 1.20 times length of 4th segment. Pronotum yellowish. Lower portion of lateral lobes with dark scales. Central transparent band of FW's narrower than two dark bands. Posterior dark band much darker than anterior dark band (Fig. 336B). File with 325 teeth. Femora I and II very pale and with concentration of dark scales at distal end. Tibiae I and II pale. Femur III nearly white on outer face; dorsal face with dark scales; distal portion of femur with dark scales on outer face; dark scales not becoming distinctly darker near distal end as in *B. iloura*. Tibia III very pale with some dark scales. Dorsum of abdomen light brown, almost same color as pronotum. Eighth and 9th tergites more darkly pigmented than most anterior tergites and with dark brown scales. Tenth tergite with two patches of setae near center and with longer lateral bristles. Venter of abdomen tan. Subgenital plate somewhat angulate but rounded at distal extremity; lateral surfaces brown (Fig. 337M). Genital processes pale. Cerci very pale with brown scales scattered on most of surface except proximal extremity. Measurements in Table 41.

Females: Pronotum yellowish, head reddish, abdomen brown. Head reddish, without distinct dark markings. Lateral lobes with dark scales. Dorsum of pronotum yellowish. Femora I and II with light background and dark scales forming a dark band at

TABLE 41. Body proportions in *Biama* species (abbreviations given in Table 31).

		No. file teeth	PL FWL	FWL AL	HW RW	FWL FWW	ML MW	BL (mm)	FL (mm)	CL (mm)	OL (mm)
<i>noccundra</i>	H	147	1.24	0.64	2.42	0.82	0.97	6.7	3.3	3.4	—
	P♂	—	1.28	0.79	2.29	0.81	0.97	6.1	—	3.2	—
<i>larnoo</i>	H	325	1.08	0.76	2.47	0.86	1.00	6.2	2.9	5.5	—
	P	—	1.02	0.76	2.35	0.91	1.00	6.3	2.7	—	—
	P♀	—	—	—	2.19	—	—	6.3	2.9	2.7	2.5
<i>coorari</i>	H	197	1.00	1.00	2.32	0.95	1.03	5.5	2.6	2.4	—
<i>iloura</i>	H	161	1.20	0.52	2.36	0.81	1.00	6.1	3.0	2.8	—
	P♀	—	—	—	—	—	—	7.0	2.9	2.3	2.6
	H	182	1.45	0.59	2.28	0.77	1.12	5.9	2.8	3.3	—
<i>allumba</i>	H	289	1.51	0.58	2.34	0.70	0.93	6.7	3.3	3.3	—
<i>camira</i>	H	395	1.14	0.95	2.12	0.78	0.90	5.9	2.8	—	—
<i>arupingi</i>	H	412	1.26	0.85	2.30	0.79	0.93	5.7	2.9	2.6	—
	P♀	—	—	—	—	—	—	6.9	3.2	3.2	3.0
	H	224	1.91	0.43	2.29	0.57	0.87	5.6	2.9	4.7	—
<i>atalumba</i>	H	347	0.98	1.65	2.35	0.90	1.00	5.7	3.3	3.1	—
<i>joonaloona</i>	H	313	1.88	0.72	2.21	0.75	0.93	6.0	3.3	—	—
	P♀	—	—	—	—	—	—	6.3	3.3	—	2.5
	P♀	—	—	—	—	—	—	6.3	3.3	—	2.8

distal end. Tibiae and tarsi I and II pale. Femur III pale, with a few dark scales on external surface, a thick concentration of dark scales on dorsal face. Tibia III with two bands of dark scales in proximal half. Dorsum of abdomen brown, darkest in the middle segments. Tenth tergite white. Ovipositor (Fig. 336F) length 2.31 times pronotal length. Cerci nearly white throughout. Measurements in Table 41.

HOLOTYPE. ♂, A-460, near Stonehenge, QLD, 14 ii 1969, ANC.

SONG. Fig. 335. Groups of about six pulses. Males taped at A-447 and A-492 not collected and may not belong to this species. Range of pulse rates at A-460 is high; perhaps several species are involved.

	p/s	kps	°C
A-460 n=3	1.2-2.4	8.0-8.6	32
?A-447	ca. 1.0	8.5	31
?A-492	ca. 1.0	5.5-6.0	22

HABITAT. Found under spinifex grass.

SPECIMENS. Holotype ♂ ANC. A-460 1♂ 1♀ ANC.

Biama coorari n. sp.

RANGE. Type locality in central QLD.

RECOGNITION. Males: Head reddish, pronotum yellowish, abdomen light brown, hind legs with

dense covering of dark brown scales. Head reddish, with patch of darker scales behind eyes. Maxillary palpi relatively short; 1st three segments brownish, last two segments somewhat lighter; length of 5th segment 2.50 times its width and 1.25 times length of 4th segment; length of 4th segment 0.80 times length of 3rd segment. Pronotum yellowish, posterior margin with light brown scales; lateral lobes mostly covered with dark scales; anterior lateral corners with thick concentration of darker scales. FW's with posterior dark band slightly darker than anterior band; pale or transparent band narrower than posterior dark band and approximately as wide as anterior dark band. File with 197 teeth. Femora I and II very pale with distinct dark band of dark scales at distal end dorsally. Tibiae I and II largely pale with light band proximally, at tympanum in tibia I and at comparable positions in tibiae I and II. Femur III with nearly white background and dorsal surface covered with dark brown scales; most of outer face with light scales, but at distal end outer face with dark scales. Tibia III with dark band in proximal region. Tarsi pale throughout. Femur III length 1.48 times length of tibiae. Dorsum of abdomen brown and with dark scales, lateral portion of each tergite darkest. Tenth tergite with small patches of setae near center, and with prominent lateral bristles. Venter of abdomen very pale

brown. Subgenital plate somewhat pointed, at least angulate, genital processes pale. Cerci with white background, white in 1st quarter, and with brown scales in the last three quarters. Measurements in Table 41.

HOLOTYPE. ♂, A-467, nr. Muttaburra, QLD, 15 ii 1969, ANC.

SONG. Produces series of single pulses according to our field notes; we did not tape song.

HABITAT. Under grass and in leaf litter on stony ground.

SPECIMENS. Holotype ♂ ANC.

***Biama iloura* n. sp., Figs. 331C, 336HLM, 337GOP**

RANGE. Central to northcentral QLD.

RECOGNITION. Males: Pronotum yellowish. Head reddish, darker than pronotum. Face with dark band at lower front corner of eyes and on pleurostoma. Maxillary palpi: Length of 5th segment 4.00 times its width and 1.17–1.33 times length of 4th segment; length of 4th 0.79–0.89 times length of 3rd. Pronotum yellowish, with 4 very small dark spots in anterior half, two in each anterior quarter. Sides of pronotum strongly convex. Transparent band of FW's approximately equal in width to posterior dark band; anterior and posterior dark bands approximately equally dark. File of holotype with 161 teeth. Femora I and II mostly pale, but with distal band of dark scales. Tibiae I and II with band of darker scales near proximal end. Femur III with ring of dark scales near distal end, and with long patch of dark scales on upper surface. Tibia III with distinct dark band in proximal third and less distinct band near distal end. In several specimens distal band much more distinct. Tarsi I, II, and III mostly pale but 3rd segment brown. Dorsum of abdomen brown, much darker than head or pronotum. Tenth tergite as in Fig. 337G. Subgenital plate brown and with rounded posterior margin. Genital processes mostly pale, but brown at base. Cerci pale with light brown scales. Measurements in Table 41.

Females: Coloration similar to male, shape of pronotum similar to male with strongly convex sides. Head reddish; back of head with six faint, longitudinal more darkly pigmented lines—lateral-most bands behind eyes. (These not pronounced in male.) Face as in male. Pronotum yellowish, with 4 very small dorsal dark spots, and with convex

lateral sides. Legs very similar to male. Dorsum of abdomen brown. Venter paler than dorsum. Subgenital plate indented along posterior margin (Fig. 337P). Ovipositor as in Fig. 336H. Cerci as in male. Ovipositor length 2.38 times length of pronotum.

HOLOTYPE. ♂, A-464, 86 miles southwest of Longreach, QLD, 14 ii 1969, ANC.

SONG. Fig. 335. Groups of single pulses (ca. 13/group). Successive groups spaced by 5 second intervals.

	p/s	kps	°C
A-464	5.1	8.2	29
A-65	4.7	8.2	29

HABITAT. Under spinifex grass on stony ground.

SPECIMENS. Holotype ♂ ANC. A-464, 3♂ 6♀ ANC, 1♂ ANSP.

***Biama allumba* n. sp., Figs. 336O, 337DL**

RANGE. Type locality in eastcentral NT.

RECOGNITION. Males: Head reddish, pronotum yellow. Abdomen dark brown. Hind femora with distal half covered with dark scales. Head reddish, and with thick covering of dark scales dorsally between antennal sockets. Face with dark marks in front of eyes and on pleurostoma. Maxillary palpi: Length of 5th segment 4.00 times its width and 1.25 times length of 4th segment; length of 4th segment 0.94 times length of 3rd segment. Pronotum pale yellow. Transparent band of FW about twice as wide as anterior and posterior dark bands. File with 182 teeth. Distal end of all femora with dark band. In femur III outer face dark in distal third, and on dorsum the dark scales cover approximately the distal two thirds. Tibiae I, II, and III with band of dark scales near proximal end; this band darkest in tibia III. Cerci brownish at base becoming lighter distally. Dorsum of abdomen dark brown. Tenth tergite as in Fig. 337D. Venter of abdomen brown distally, lighter proximally. Subgenital plate more or less rounded. Cerci with brown pigmentation at base; background color becoming lighter distally, but dark scales extending to tip, extreme tip somewhat pale and without scales. Genital processes light brown (Fig. 336O). Measurements in Table 41.

HOLOTYPE. ♂, A-72, James River, QLD, 17 ix 1968, ANC.

SONG. Not known.

HABITAT. Male collected on bridge across James River.

SPECIMENS. Holotype ♂ ANC.

Biama camira n. sp., Figs. 336AN, 337F

RANGE. Type locality in northcentral QLD.

RECOGNITION. Males: Similar to *B. allumba* but dorsum of head with light scales between antennal sockets, and file count quite different. Head reddish with light scales dorsally between antennal sockets. Face with only faint dark marks in front of eyes and on pleurostoma. Back of head with patch of dark scales behind eyes, next to pronotum. Maxillary palpi: length of 5th segment 4.8 times its width and 1.41 times length of 4th segment; length of 4th segment 0.94 times length of 3rd segment. Pronotum yellow. FW's as in Fig. 336A. Posterior dark band darker than anterior dark band. File with 289 teeth. Legs very pale. Femora I and II with light brown scales near distal end. Tibiae I and II very pale. Femur III with faint dark ring near distal end and with scattering of light brown scales on upper face. Tibia II with very faint band in proximal third. Dorsum of abdomen dark brown. Tenth tergite as in Fig. 337F. Subgenital plate rounded posteriorly. Genital processes mostly pale, but dark brown at base. Cerci pale with greyish scales. Measurements in Table 41.

HOLOTYPE. ♂, A-470, 55 miles south of Hughenden, QLD, 15 ii 1969, ANC.

SONG. Not known.

HABITAT. Grasslands.

SPECIMENS. Holotype ♂ ANC.

Biama arupingi n. sp., Figs. 336J, 337E

RANGE. Type locality in northwestern WA.

RECOGNITION. Males: Pronotum yellow, head reddish, femora with dark bands, maxillary palpi reddish proximally, white distally. Head reddish brown, darker than pronotum. Dorsum and sides of head with black scales, concentrated mainly below and behind eye. Maxillary palpi: First 3 segments reddish, last two white. Length of 5th segment 3.00 times width and 1.31 times length of 4th segment; length of 4th segment 1.00 times length of 3rd segment. Pronotum yellow, much lighter than head; anterior margin and lower margin of lateral lobes with small dark scales. Transparent band of FW's

narrower than anterior and posterior dark bands. File with 395 teeth. Femora I and II with pale background and with dark (nearly black) scales in distal half; in femur I scales are distributed along almost entire outer face. Tibia I uniformly covered with dark scales; tibia II less profusely covered (they may have been rubbed off). Tarsi I and II lighter than tibiae. Femur III with lower external half of femur pale, dorsal face with brown scales more or less uniformly distributed on pale background. Tibia III with covering of dark scales—these slightly more concentrated between serrations. Dorsum of abdomen pale, yellow-white background with dark brown scales along posterior margins and in lateral extremity of each tergite. Tenth tergite very pale with two groups of setae near center (Fig. 337E). Venter of abdomen pale. Subgenital plate pointed; mostly pale, but with dark scales along postero-lateral margin. Genital processes pale. Cerci missing. Measurements in Table 41.

HOLOTYPE. ♂, A-713, Ashburton River, WA, 11 v 1969, ANC.

SONG. Fig. 335. Succession of pulses with slow pulse rate.

	p/s	kps	°C
A-713 n=4	5.3-6.5	7.4-9.1	26

HABITAT. Among grass and leaf litter along banks of Ashburton River.

SPECIMENS. Holotype ♂ ANC.

Biama arila n. sp., Figs. 336DGP, 337BJ

RANGE. Type locality in northwestern WA.

RECOGNITION. Males: Similar to *B. arupingi* but head and pronotum dark. Head dark brown, face reddish. Maxillary palpi: 4th and 5th segments white, 1st, 2nd, and 3rd segments reddish. Length of 5th segment 3.57, 3.71 times its width and 1.19, 1.30 times length of 4th segment; 4th segment 0.95, 1.05 times length of 3rd segment. Pronotum dark brown, scales at distal margin dark. Transparent band of FW and posterior dark band approximately equal in width. File with 412 teeth. Legs dark brown, nearly black; tarsi much lighter than tibiae.

Dorsum of abdomen dark brown. Tenth tergite pale, with two tufts of setae near center (Fig. 337B). Subgenital plate pointed (Fig. 337J). Genital pro-

cesses light brown, dark brown at base. Cerci pale proximally, becoming brown distally. Measurements in Table 41.

Females: Body color dark brown. Head and pronotum deep reddish brown. Front of face reddish brown. Maxillary palpi as in male. Legs as in male. Tergum dark brown. Tenth tergite with patch of dark scales in center. Cerci pale at base, acquiring dark scales near end of 1st quarter, these continuing to tip. Sternum much lighter than tergum. Ovipositor as in Fig. 336G. Ovipositor length 2.40 times length of pronotum.

HOLOTYPE. ♂, A-898, near Nullagine, WA, 20 v 1969, ANC.

SONG. Fig. 335. Succession of double-pulse chirps. We taped two such songs at type locality and do not know which song belongs to this species.

	p/s	ch/s	kps	°C
A-898 n=3	5.4-6.5	1.9-2.5	6.6-7.2	23
A-898	11.1	2.5	7.4	23

HABITAT. Open stony country, among grasses, near ground.

SPECIMENS. Holotype ♂ ANC. A-898 1♂ 1♀ ANC.

***Biama kantalpa* n. sp., Figs. 336CEK, 337AK**

RANGE. Type locality in northwestern NT.

RECOGNITION. Males: Body color mostly yellowish, head reddish with brownish scales; small brown scales more concentrated behind eyes. Face yellowish, with faint network of reddish lines on frons. Maxillary palpi: slender, largely pale; length of 5th segment 4.40 times its width and 1.22 times length of 4th segment; length of 4th segment 1.00 times length of 3rd segment. Pronotum yellow-orange, lighter than head and with strongly convex sides. File with 224 teeth. Femora I and II with brown scales concentrated at distal end, but these not dark and relatively indistinct. Tibiae I and II unbanded. Femur III largely pale, especially on lower outer face, but with dark scales on upper face; femur darkest distally beginning about 2.5 tibial diameters from distal end. Tibia III with brown scales arranged in indistinct bands. Dorsum of abdomen brown, becoming slightly darker distally. Area between cerci lighter; tergites darkest at lateral margins; 10th tergite as in Fig. 337A, and slightly reddish. Subgenital plate brown, and pointed (Fig.

337K). Genital processes (Fig. 336K) pale distally but with dark base. Cerci pale with scattered greyish-brown scales along length; extreme tip dark brown and without scales. Measurements in Table 41.

HOLOTYPE. ♂, A-207 near Wave Hill, WA, 5 x 1968, ANC.

SONG. Fig. 335. Groups of 5-8 chirps, each chirp with two pulses.

	p/s	ch/s	kps	°C
A-207	23.6	3.1	9.8	33

HABITAT. Near ground on grey soil plain nearly without vegetation.

SPECIMENS. Holotype ♂ ANC. A-207 1♂ ANC.

***Biama atalumba* n. sp.**

RANGE. Type locality in southwestern NSW.

RECOGNITION. Males: Head, thorax, and abdomen reddish with dark brown scales. FW's dark brown with narrow, middle, transverse light band. Face reddish or rusty colored, with dark scales concentrated beneath and behind eyes. Maxillary palpi: generally pale or very light brown. Length of 5th segment 2.5 times its width and 1.33 times length of 4th segment; length of 4th segment 0.88 times length of 3rd segment. Pronotal disk with dark scales in anterior half, and pale transparent scales in posterior half. Lateral surfaces covered with dark brown scales. FW's about as long as pronotum; with broad anterior and posterior dark bands separated by a narrow pale band about half as wide as dark bands. Lateral surfaces of FW's brown. File with 347 teeth. Femora I and II pale, with distal band of brown scales; tibiae I and II pale, but very slightly darker proximally. Femur III pale, with dark brown scales covering approximately posterior 2/3 of dorsal surface; outer face mostly pale except dorsal and posterior portions which are covered with dark scales; tibiae III light brown with slightly darker scales scattered more or less evenly throughout. Dorsum of abdomen brown, with dark brown scales; 10th tergite pale with two patches of darker scales along posterior edge and on either side of center. Venter of abdomen pale brown anteriorly, darker posteriorly. Genital processes pale. Cerci pale with scattered brown scales. Measurements in Table 41.

HOLOTYPE. ♂, A-437, 130 miles south of Broken Hill, NSW, 11 ii 1969, ANC.

SONG. Fig. 335. Double-pulse chirps with the two pulses different in length and very closely spaced.

	ch/s	kps	°C
A-437	1.9	5.6	22

HABITAT. Found in leaf litter in open woodland south of Broken Hill, NSW.

SPECIMENS. Holotype ♂ ANC.

Biama joonaloona n. sp.

RANGE. Type locality in northwestern WA.

RECOGNITION. Males: Head and pronotum reddish brown. Abdomen more yellowish. Head reddish brown with dark scales concentrated behind eyes; rostrum reddish. Maxillary palpi: 3rd segment reddish brown, 4th segment pink in proximal region; length of 5th segment 4.0 (3.42) times its width and 1.2 (1.2) times length of 4th segment; length of 4th segment 0.95 (0.95) times length of 3rd segment. Lateral pronotal lobes with dark scales along lower margin; anterior lateral corner (behind eyes) with dark scales. Posterior half of pronotum darker than anterior half.

Transparent band of FW's narrower than posterior dark band. Lateral surface of FW's entirely dark. File with 313 teeth. Femora I and II with white background, and with dark scales concentrated in band near distal end. Tibiae I and II with brown scales approximately like distal portion of femur. Femur III pale, scales largely removed. Scales appear to have been most concentrated on top and in distal half. Tibia III darkest proximally, but generally pale. Tarsi pale. Dorsum of abdomen light brown, yellowish. Tenth tergite pale, with two tufts of setae centrally and longer lateral setae, somewhat similar to *B. allumba*, but posterior margin not as concave or V-shaped. Venter of abdomen very pale. Subgenital plate comes to point distally and has some brown scales laterally. Genital processes pale. Cerci pale, at base very pale, rest of cerci lost. Measurements in Table 41.

Females: Head and pronotum reddish brown, lateral portion of pronotum with darker scales. Abdomen (broken) pale brown. Distal ends of femora distinctly banded. Tibiae dark. Head as in male, but

with some dark scales on occiput. Pronotum with dark scales along lateral margins of disk and at posterior lateral corners. Pronotum same color as head. Dorsum of abdomen light brown with darker scales in lateral region of each tergite. Femur I with almost entire outer face covered with dark scales and distinct distal band dorsally. Femur II with lateral dark scales and with dorsal scales more concentrated near distal end than in femur I. Tibiae I and II brown, covered with brown scales, tarsi I and II pale, lighter than tibiae. Femur III with pale background and with concentration of dark scales on upper and lateral surfaces. Tibia III covered with dark scales. Posterior margin of subgenital plate with slight notch. Ovipositor length 2.0–2.1 times pronotal length. Measurements in Table 41.

HOLOTYPE. ♂, A-884, near Marble Bar, WA, 20 v 1969, ANC.

SONG. Fig. 335. Succession of 3-pulse chirps.

	p/s	ch/s	kps	°C
A-884 n=3	13.3–17.4	2.1–3.1	8.7–8.8	27

HABITAT. Under spinifex grass on stony ground.

SPECIMENS. Holotype ♂ ANC. A-884 1♂ 2♀ ANC.

KALYRA n. gen.

TYPE SPECIES: *Kalyra pillinda* n. sp.

One species, *K. pillinda* is from eucalypt forests of eastern Queensland, the other species are from more arid portions west of the dividing range.

RECOGNITION. Fig. 338AB. Males small (body length 4.8–7.3 mm) and dark, nearly black; females larger and lighter. FW's with two dark transverse bands, one anteriorly and one posteriorly and pale or transparent central band (in *K. karka* and *K. goparinga* anterior dark band interrupted medially by pronotum). Maxillary palpi generally dark and short: length of 5th segment varies from 1.67 to 2.43 times its greatest width and from 1.0 to 1.25 times length of fourth segment. In males 10th tergite pale and genital processes vary from light brown to brown. In females subgenital plate not notched along posterior margin. Females resemble females of genus *Kiah*.

TABLE 42. Comparison of *Kalyra* species.

	Number of file teeth	Pronotal length more than 2 times exposed tegminal length	Anterior dark band of tegmina not continuous	10th tergite with two spine-shaped projections centrally	Femur III length not more than 1.3 times tibial length	Exposed length of tegmen less than 0.6 times its width
<i>pillinda</i>	67	—	—	+	—	—
<i>karka</i>	136	— +	— +	—	+	+
<i>gililpi</i>	110	—	—	—	—	—
<i>goparinga</i>	?	+	+	—	+	+
<i>mjöbergi</i>	?	—	+	?	+	—

***Kalyra pillinda* n. sp., Figs. 338A, 340ABC**

RANGE. Northcentral to southeastern coastal QLD.

RECOGNITION. Males: Small, nearly all black. Pronotum with dark scales along posterior margin. Transparent band on FW distinctly narrower than posterior dark band. Tenth tergite of abdomen with two brown spinelike projections near center. Cerci lost. Genital process brown, darker distally. Head dark brown, face and sides of head nearly black, palpi very dark. Maxillary palpi: Length of 5th segment 2.22, 1.70 times its width; and 1.11, 1.00 times length of 4th segment; length of 4th segment 0.95, 1.00 times length of 3rd segment. Pronotum very dark brown with black scales. FW's with black bands across anterior and posterior regions and a middle transparent, somewhat milky band. File with 54–67 teeth ($n=4$). Legs with dark brown background coloration and black scales. Dorsum of abdomen mostly black. Tenth tergite pale and with two spinelike processes near center separated by distance equalling their basal diameter. Venter of abdomen generally dark brown, darker distally. Subgenital plate rounded. Genital processes light brown. Measurements in Table 43.

Females: Specimens poorly preserved. Body color dark brown. Femora with light background coloration and with dark scales concentrated distally on femora I and II. Tibiae brown. Ovipositor slightly bowed. Subgenital plate without indentation along

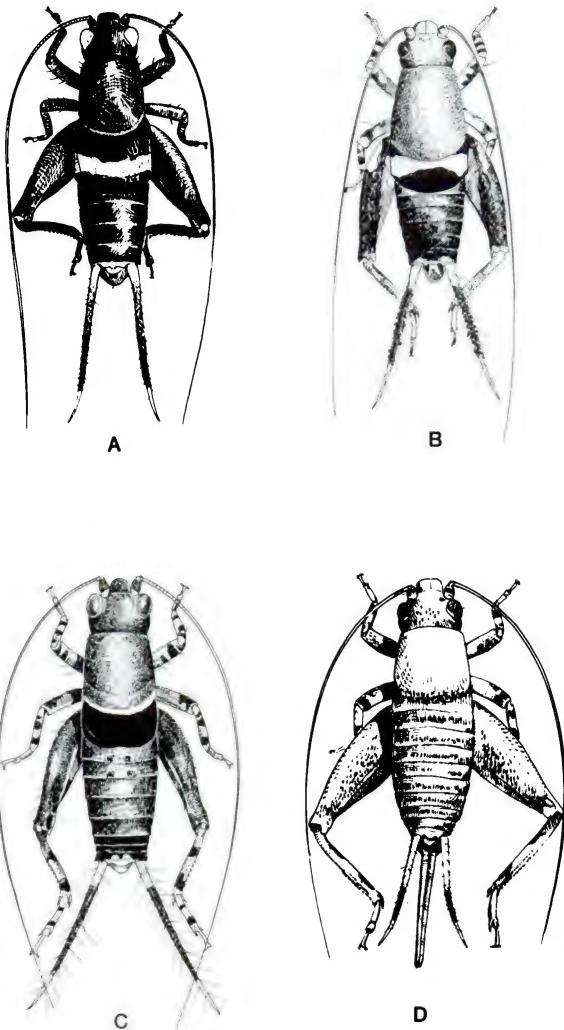


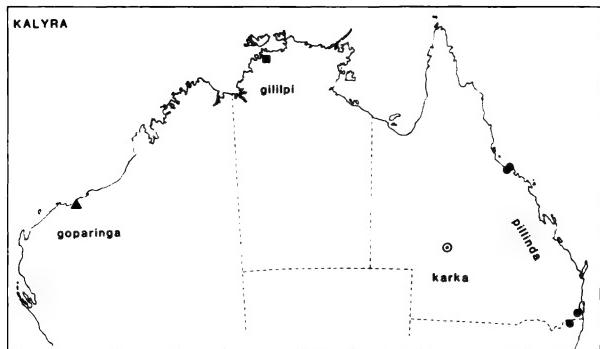
FIG. 338. A, *Kalyra pillinda*; B, *Kalyra goparinga*; C, *Kiah palanu*; D, *Kiah karrawilya* female.

posterior margin. Ovipositor length 2.11 (2.11) times pronotal length. Measurements in Table 43.

HOLOTYPE. ♂, A-547 near Woodenbong, NSW, 25 ii 1969, ANC.

SONG. Fig. 345. Succession of 18–30 pulses. At A-51, 1–3 pulses at end of series often somewhat separated. Groups of pulses separated by intervals of ca. 4 s at A-51.

	p/s	kps	°C
A-547	5.3	8.2	21
A-538	6.8	7.6	24
A-51	6.4	9.4	23

FIG. 339. Distributions of *Kalyra* species.

HABITAT. Found near ground in grasses and leaf litter in eucalyptus woodland. Males sing in daytime.

SPECIMENS. Holotype ♂ ANC. A-10 1♂ ANC. A-51 1♂ ANC. A-538 1♂ 2♀ ANC.

Kalyra mjöbergi (Chopard)

Hoplosphyrum mjöbergi Chopard 1925: 21. Holotype ♂, Cedar Creek, QLD, SM. Transferred to *Ornebius* by Chopard 1951. Type examined.

RANGE. Type locality in Cedar Creek, QLD. Not plotted in Fig. 339 because there are several Cedar Creek's in QLD.

RECOGNITION. General coloration black and cream. Head entirely black. Legs mottled black and yellow; hind femur mottled. Lateral field of tegmina black. Base and apex with transverse black band; anterior band interrupted centrally. Pronotum en-

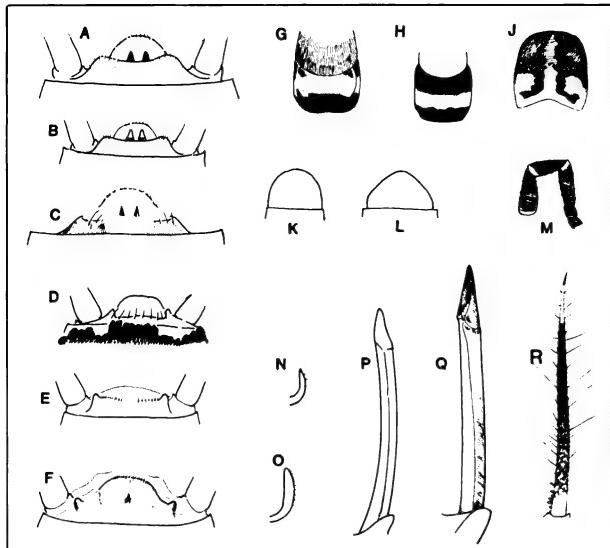


FIG. 340. *Kalyra*. A-F, tenth tergite of abdomen: A, B, C, *pillinda*; D, *goparinga*; E, *gillipi*; F, *karka*. G, wings of *karka*; H, wings of *pillinda*; J, frons of *gillipi*; K, subgenital plate of *gillipi*; L, subgenital plate of *pillinda*; M, max. palpi of *pillinda*.

tirely dark brown to black. Hind tibiae banded, mostly dark (see Figs. 39, 41, 42 in Chopard 1925). Measurements in Table 43.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♂ SM.

Kalyra gillipi n. sp., Fig. 340EJK

RANGE. Type locality in Darwin area, NT.

TABLE 43. Body proportions in *Kalyra* species (abbreviations given in Table 31).

		No. file teeth	PL FWL	FWL AL	HW RW	RW RL	FWL FWW	ML MW	BL (mm)	FL (mm)	CL (mm)	OL (mm)
<i>pillinda</i>	H	58-67 n=4	1.43	0.57	2.57	2.60	0.75	0.81	7.3	3.5	—	—
	P♂	64	1.59	0.91	2.66	2.18	0.66	0.78	—	—	—	—
	P♀	—	—	—	—	—	—	—	6.7	3.6	—	3.2
	H	—	—	—	—	—	—	—	6.5	4.0	—	—
<i>mjöbergi</i>	H	110	1.21	0.78	2.57	2.10	0.82	0.87	4.8	2.4	3.8	—
	P♂	—	1.37	0.54	2.50	2.33	0.77	0.95	5.4	2.5	4.2	—
<i>karka</i>	P♀	—	—	—	—	—	—	—	4.8	2.3	—	2.75
	H	136	2.22	0.42	2.52	2.17	0.54	—	6.3	2.9	3.5	—
<i>goparinga</i>	H	—	—	—	—	—	—	—	6.8	3.7	4.3	2.8
	P♀	—	2.64	0.45	2.45	—	0.47	0.95	4.8	2.8	2.9	—

RECOGNITION. Males: Similar to *K. pillinda*, but differing as follows: pale band across FW's distinctly broader than posterior dark band; posterior portion of pronotum lighter from point where wings emerge from pronotum to distal end; 10th tergite of abdomen as in Fig. 340E; femur III distinctly darker on dorsal proximal surface. Facial markings as in Fig. 340J, cerci banded as in *K. pillinda*, but dark scales brown rather than black; posterior margin of subgenital plate rounded; genital processes pale brown, and with basal, lateral brown streak. File with 110 teeth (holotype). Measurements in Table 43.

Females: Paler than male, much lighter than female of *K. pillinda*. Frons as in Fig. 340J. Rostrum reddish on top. Dorsum of head lighter, more orange. Scape largely brown. Occiput with small dark scales. Side of head with brown streak along lower margin. Maxillary palpi mostly dark brown as in male; length of 5th segment 1.78 times its width and 1.23 times length of 4th segment; length of 4th segment 0.87 times length of 3rd segment. Pronotal scales largely removed; scales along posterior margin slightly darkened. Lower portion of lateral lobes with reddish brown pigmentation. Legs strongly banded, especially tibiae. Basal tarsal segments largely dark. Femur III length 1.38 times tibial length. Dorsum of abdomen: each tergite with brown scales along posterior margin, darkest along lateral margin. Tenth tergite with dark patch of scales centrally. Subgenital plate pale. Cerci pale proximally, distal end broken off. Ovipositor length 2.53 times pronotal length.

HOLOTYPE. ♂, A-131 near Berrimah, NT, 25 ix 1968, ANC.

SONG. Not known. Long stridulatory file suggests song with long pulses.

HABITAT. Found on ground in leaf litter in open eucalyptus woodland.

SPECIMENS. Holotype ♂ ANC. A-131 2♂ 2♀ ANC.

***Kalyra karka* n. sp., Fig. 340FG**

RANGE. Type locality in central-southwestern QLD.

RECOGNITION. Males: Similar to *K. pillinda*, but differing in following: FW's as in Fig. 340G; genital processes slender distally, pointed and black; 10th tergite as in Fig. 340F. 1st segment of tarsus III

pale. Maxillary palpi: Length of 5th segment 2.12–2.25 times its width and 1.12–1.20 times length of 4th segment; length of 4th segment 0.88–0.94 times length of 3rd segment. File with 136 teeth (holotype). Measurements in Table 43.

Females: Quite similar to *K. gililpi*. Dark markings on face less distinct. Scape brown. Lateral lobes of pronotum pale; legs with pale background color and banded. Femur III with scales darkest in distal half. Posterior margin of tergites without distinct dark scales. Cerci very pale in first half, becoming greyish gradually in 3rd quarter, 4th quarter white. Subgenital plate brown and not indented. Ovipositor as in *K. gililpi*. Ovipositor length 2.00, 1.83 times pronotal length.

HOLOTYPE. ♂, A-460 near Stonehenge, QLD, 14 ii 1969, ANC.

SONG. Not known.

HABITAT. Collected under spinifex in rocky area near Stonehenge, QLD.

SPECIMENS. Holotype ♂ ANC. A-460 3♂ 2♀ ANC.

***Kalyra goparinga* n. sp., Figs. 338B, 340D**

RANGE. Type locality in northwestern WA.

RECOGNITION. Males: Head and pronotum reddish brown. Anterior dark band on FW's interrupted centrally by pronotum (Fig. 338B). Dorsum of abdomen black. Hind femora mostly black with white, anterior lateral patch. Head reddish brown with black scales behind eyes and on top of head; black just behind antennal socket. Frons with dark lines running along epistomal suture curving dorsally near center then joining in middle of frons. Each segment of maxillary palpi mostly dark, but light proximally and distally. Length of 5th segment 1.67 times its width and 1.25 times length of 4th segment; length of 4th segment 0.83 times length of 3rd segment. Lateral pronotal lobes light, dark scales at anterior lateral corner in posterior region. FW's short, with anterior dark band interrupted by pronotum (Fig. 338B). Femora I and II with light background and black scales on outer and upper surfaces. Tibiae with three bands. Distal $\frac{2}{3}$ of femur III darkly pigmented. Anterior lateral surface with pale area. Tibia III with two dark bands on under side, one in proximal half, one in distal half. Region between serrations with line of dark scales. Tarsus III pale except for 3rd segment which is dark in

distal half. Tarsi I and II similar. Dorsum of abdomen covered with black scales. Tenth tergite pale, almost white. Venter of abdomen light brown anteriorly, becoming dark brown posteriorly. Subgenital plate with black scales. Genital processes very pale. Cerci with broad central section covered with black scales. Measurements in Table 43.

Females: Body color light brown. Head yellowish. Face very pale but with dark line as in male. Side of face below eyes with dark mark. Pronotum yellowish throughout (scales may have been removed); anterior region just behind eyes had dark scales. Legs as in male. Dorsum of abdomen light brown; venter almost white, except subgenital plate dark brown and lacking notch along posterior margin. Cerci pale brown. Ovipositor bowed throughout and tapering terminally. Ovipositor length 1.94 times pronotal length.

HOLOTYPE. ♂, A-736, Whim Creek, WA, 12 v 1969, ANC.

SONG. Complex chirps consisting of double-pulse units followed by single pulses. Such 3-pulse chirps repeated several times in succession. Song not taped.

HABITAT. In spinifex on rocky rolling hills.

SPECIMENS. Holotype ♂ ANC. A-736, 1♀ ANC.

KIAH n. gen.

TYPE SPECIES: *Kiah palanu* n. sp.

These species are from the interior of northern Australia and occur in grassy, slightly wooded plains.

RECOGNITION. Males recognized by following characteristics: Body length 4.7–5.8 mm. FW's entirely black. Anterior portion of mirror hidden beneath pronotum. Head and pronotum with numerous dark scales. Hind femur brown to dark brown. Dorsal abdominal segments nearly black along their lateral margins; distal segments largely black, except 10th tergite pale and distal margin of 9th tergite nearly white. Cerci banded, mostly black. Genital processes pale.

KEY TO KIAH SPECIES

- Background color of head and pronotum yellowish. Tibia III with 3 dark bands. File with 99–108 teeth *palanu*

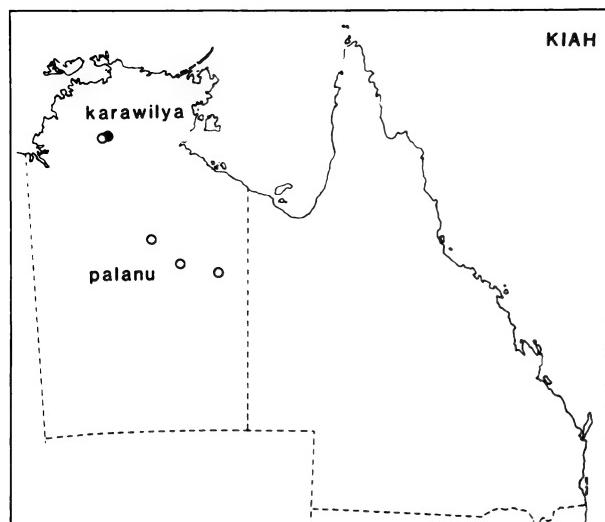


FIG. 341. Distributions of *Kiah* species.

Background color of head and pronotum dark brown.
Tibia III without dark bands. File with ca. 129 teeth *karrawilya*

Kiah palanu n. sp., Figs. 338C, 342A

RANGE. Central to northcentral NT.

RECOGNITION. Males: Head and pronotum with yellow background but mostly covered with dark brown scales. FW's black. Legs (especially tibiae) strongly banded. Dorsum of abdomen black posteriorly. Cerci banded. Dorsum of head with yellowish background and mostly covered with dark brown scales; scales most densely concentrated behind eyes. Face with two lines of reddish brown pigment on frons. Scape with dark scales on upper and outer surfaces. Maxillary palpi: 3rd, 4th, and 5th segments mostly dark brown but each segment pale at distal end. Length of 5th segment 2.14 times its width and 1.15 times length of 4th segment; length of 4th segment 0.86 times length of 3rd segment. Pronotal disk mostly covered with dark

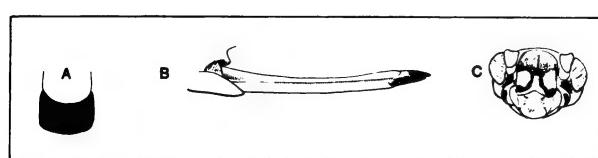


FIG. 342. *Kiah*. A, *palanu* FW; B, *karrawilya* ovipositor; C, face of *karrawilya* ♀.

TABLE 44. Body proportions of *Kiah* and *Pongah* species (abbreviations as in Table 31).

		No. file teeth	PL FWL	FWL AL	HW RW	RW SW	FWL FWW	BL (mm)	FL (mm)	CL (mm)	OL (mm)
<i>K. palanu</i>	H	99	2.16	0.28	2.52	2.30	0.53	5.8	2.8	3.3	—
A-107	P♂	108	—	—	—	—	—	6.0	2.8	3.2	—
A-687	P♀	—	—	—	—	—	—	5.9	3.2	4.3	2.9
<i>K. karrawilya</i>	H	129	1.80	0.36	—	—	—	4.8	2.4	3.1	—
	P♀	—	—	—	—	—	—	6.0	3.3	4.25	—
<i>P. indooroopilly</i>	H	67	FW's mostly hidden		1.96	4.00	—	4.1	2.0	1.5	—
	P♀	—	FW's mostly hidden		—	—	—	4.2	2.3	1.7	1.35
<i>P. wanboo</i>	H	105	FW's mostly hidden		2.1	3.52	—	5.2	2.4	—	—
<i>P. ilara</i>	H	111	FW's mostly hidden		2.1	3.2	—	4.9	2.7	—	—
	P♂	104	—	—	2.2	3.0	—	5.3	2.5	—	—
	P♀	—	—	—	—	—	—	5.8	2.7	2.2	1.6

scales; these most concentrated in dorso-lateral region; near distal end dark scales replaced rather suddenly by much lighter scales.

FW's entirely black and very short. File with 99 (holotype) 103, 108 teeth. Femora I and II with dark scales on upper and outer faces. Tibiae I and II with three distinct bands: central and distal bands about equal in length and darkness, and longer than proximal band. Femur III dark brown to black. Tibia III with proximal band consisting of small ring of black scales, and two wider central and distal bands approximately equal in length and darkness. Dorsum of abdomen darker distally; 6th through 9th tergites mostly black; tergites anterior to this yellowish with dark spots centrally. Distal margin of 9th tergite white. Tenth tergite mostly dark, but very pale at proximal and distal ends. Cerci banded. Measurements in Table 44.

Females: Body color light brown to yellow, with scattered dark scales. Legs with dark bands. Dorsum of head with numerous dark brown scales. Rostrum with pale scales. Scape with brown scales. Femora I and II with pale background and covered with dark scales on top and outer faces. Tibiae I and II distinctly banded; central and distal dark bands equal in length and longer than proximal band; all three bands equally dark. Femur III with dark brown scales on top and outer faces, and with pale spots without scales within these brown areas; femur darkest dorsally near distal end. Proximal

dark band of tibia III consisting of a few dark scales; central and distal bands very distinct, with central band slightly longer than distal band. Each dorsal abdominal segment with row of dark scales near posterior margin and at lateral margins. Subgenital plate brown and not indented at posterior margin. Ovipositor slightly bowed. Ovipositor length 2.33 times pronotal length. Cercus with light background and gray brown scales, which become slightly darker posteriorly; distal end white. Differs from *Karrawilya* in not having dark black band on cerci in 3rd quarter.

HOLOTYPE. ♂, A-687, 1 mile west of Barry Caves, NT, 17 ix 1968, ANC.

SONG. A longer trill followed by triple-pulse, double-pulse, or single-pulse chirps. One song consisted of 18 pulses followed by 3 pulses; another consisted of 20 pulses followed by two single pulses. Songs were separated by intervals of about 20 seconds. The song taped at A-460 consisted of a 10-pulse trill followed by a single pulse after 0.08 s and another single pulse after another 0.16 s, then 2 closely spaced pulses after another 0.1 s. In two other songs at this locality, trills were followed by a single pulse, then a 2-pulse unit. The pulse rate within the 2-pulse unit was the same as the trill.

	p/s	p/tr	kps	°C
A-231 n=2	31.5, 32.0	15, 19	8.1	28

HABITAT. Grassland.

SPECIMENS. Holotype ♂ ANC. A-107 1♂ ANSP. A-163 1♂ 1♀ ANC. A-231 1♂ 1♀ ANC. A-687 1♀ ANC.

Kiah karrawilya n. sp., Figs. 338D, 342BC**RANGE.** Type locality in northern NT.

RECOGNITION. Males: Background color of head and pronotum dark brown, face somewhat reddish. Abdominal tergites 7, 8, and 9 black throughout, 4th, 5th, and 6th tergites light centrally and each with four dark spots—two larger more lateral spots, and two smaller, less distinct central spots. Tibia III not distinctly banded between serrations. Genital processes dark brown. File with 129 teeth (holotype).

VARIATION. In another male from A-163 background color of pronotum light brown, with sudden transition from dark scales to light scales near posterior end of pronotum; 1st segment of tarsus III unbanded. Area between serrations of tibia III unbanded. Face as in *K. palanu*. Last three abdominal tergites also distinctly darker than preceding segments (which have dark spots). Still another male from A-163 looks like *K. palanu*, but without sudden transition from lighter to black abdominal tergites. Measurements in Table 44.

Females: Body color, light brown to yellowish with black scales on back of pronotum. Dorsum of head pale brown, with dark scales behind eyes, at posterior margin of antennal sockets, and on upper and outer surfaces of scape. Face as in male. Side of face with brown line along lower margin. Pronotum with dark scales concentrated near posterior margin. Legs with very pale background. Femora I and II pale, with black scales on upper and outer faces, more concentrated distally in femur II. Dorsum of abdomen pale brown; each tergite with transverse line of darker scales. Cerci pale in first half, black in 3rd quarter, and white in 4th quarter; extreme tip brown. Ovipositor slightly bowed throughout (Fig. 342B).

HOLOTYPE. ♂, A-163, 25 miles west of Katherine, NT, 29 ix 1968, ANC.

SONG. Single pulses followed by a 5–6 pulse chirp.

p/s					
A	B	ch/s	kps	°C	
A-163	20.0–27.7	8.0–14.2	1.7–2.9	8.0–8.6	35

HABITAT. Grass clumps.

SPECIMENS. Holotype ♂ ANC. A-163 2♂ 2♀ ANC.

PONGAH n. gen.

TYPE SPECIES: *Pongah indooroopilly* n. sp.

These species live in leaf litter on the ground both in rain forests and in open eucalypt forests of the drier interior.

RECOGNITION. Fig. 343. Very small, brown to dark brown crickets. FW's completely hidden beneath pronotum. Head very wide between antennae, rostrum as least three times as wide as scape. Head 1.89 to 2.21 times as wide as rostrum. Length of 5th segment of maxillary palpi at least 2.5 times its greatest width and 1.2–1.5 times length of 4th segment. Length of femur III 1.4–1.6 times length of tibia III. Genital processes not visible. Basal tarsal segment of leg III very long, slightly less than $\frac{1}{2}$ the length of tibia III.

KEY TO PONGAH SPECIES

- | | |
|---|----------------------|
| 1. Head shape as in Fig. 346B | <i>ilara</i> |
| Head shape more as in Fig. 346A | 2 |
| 2. Subgenital plate as in Fig. 346C. File with 67 teeth | <i>indooroopilly</i> |
| Subgenital plate as in Fig. 346D. File with ca. 105 teeth | <i>wanboo</i> |

Pongah indooroopilly n. sp., Figs. 343, 346AC**RANGE.** Northern NT.

RECOGNITION. Males: Very small and brown. Head reddish brown. Pronotum virtually covering FW's. Dorsum of head reddish brown. Rostrum wide relative to width of scape (Fig. 343). Front of face yellowish, with inverted Y-shaped dark mark. Maxillary palpi: each segment brown except for proximal and distal extremities; length of 5th segment 3.00, 2.67 times its width and 1.50, 1.33 times length of 4th segment; length of 4th segment 0.83, 0.92 times length of 3rd segment. Pronotum reddish brown, darker anteriorly; lateral lobes darker than disk. FW's almost entirely hidden beneath pronotum. File with 67 teeth (holotype). Leg I brown, unbanded. Femur III light brown, with dark brown scales on upper face. Dorsum of abdomen light brown in background color, with darker brown scales. Venter of abdomen light brown with pale

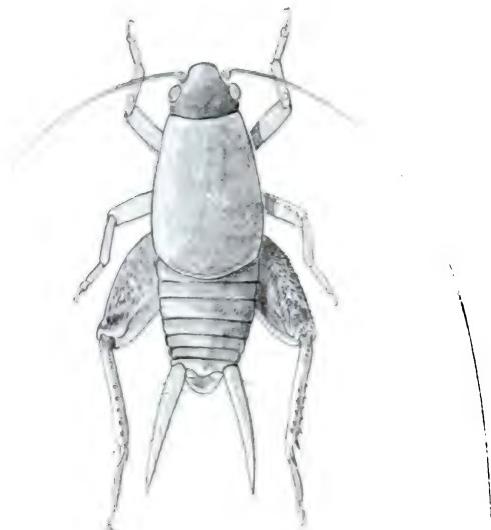


FIG. 343. *Pongah indooroopilly* male.

scales. Width of subgenital plate more than twice its length; weakly bilobate. Cerci short, brown.

Females: Very small, light brown. Head as in male. Maxillary palpi as in male: length of 5th segment 2.83–3.20 times its width and 1.31–1.42 times length of 4th segment; length of 4th segment 0.86–1.00 times length of 3rd segment. Pronotum lighter than head, lateral lobes with dark brown scales. Legs I and II with dark brown scales. Femur III as in male. Dorsum of abdomen light brown and slightly banded with transverse brown bands (each segment with band of dark scales). Central, posterior edge of 8th and 9th tergites very pale. Venter of abdomen light brown, without dark brown scales. Subgenital plate longer than wide, darker than preceding segments. Ovipositor pale, short, length 1.33 (0.94–1.31) times length of pronotum.

HOLOTYPE. ♂, A-155, 32 miles southwest of Cooinda, NT, 28 ix 1968, ANC.

SONG. Fig. 345. Short faint trill composed of ca. 11 pulses. We did not tape captured males but believe they had a song similar to that taped at A-131.

	p/s	p/ch	kps	°C
A-131	42.0	11	8.4	27

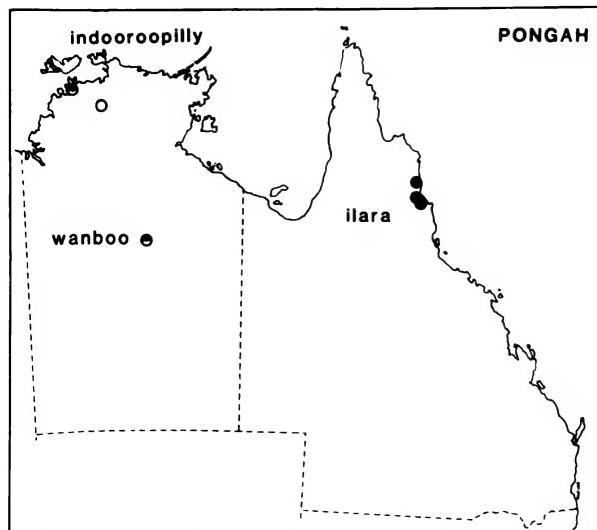


FIG. 344. Distributions of *Pongah* species.

HABITAT. In leaf litter in open woodland.

SPECIMENS. Holotype ♂ ANC. A-155 1♂ 2♀ ANC. A-131 1♂ 3♀ ANC.

Pongah wanboo n. sp., Fig. 346D

RANGE. Central to northern NT.

RECOGNITION. Males: Similar to *M. indooroopilly*, but differing in following respects: Face reddish and with inverted Y-shaped dark mark. File with ca. 105 teeth. Maxillary palpi: Length of 5th segment 2.83 times its width and 1.31 times length of 4th segment; length of 4th segment 1.00 times length of 3rd. Abdomen darker, 10th tergite of abdomen with dark reddish-brown pigmentation. Subgenital plate longer—width less than twice its length; posterior portion coming to a point. Cerci missing. Measurements in Table 44.

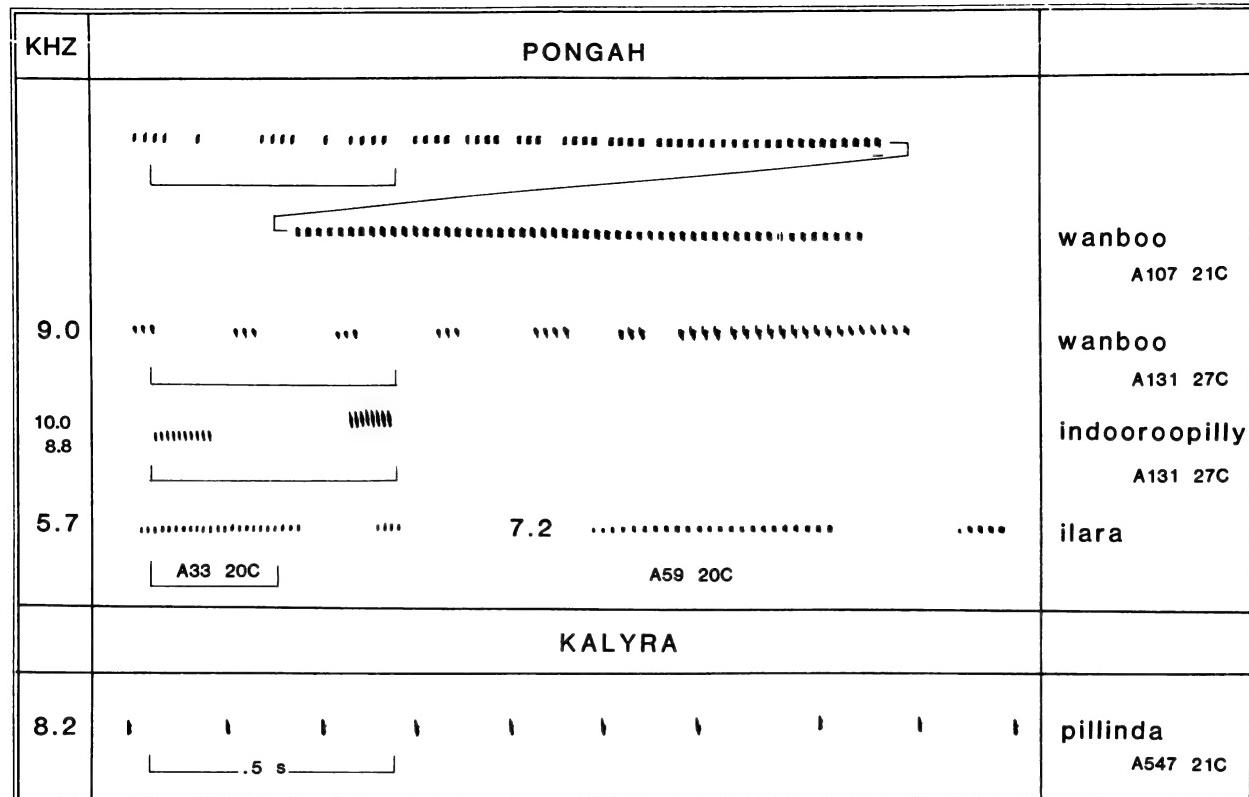
HOLOTYPE. ♂, A-107, 73 miles north of Tennant Creek, NT, 21 ix 1968, ANC.

SONG. Fig. 345. High pitched trill which begins as series of short chirps and gradually changes into continuous trill.

	p/s	kps	°C
A-107	46.0	8.8	21
A-131	40.0	9.0	27

HABITAT. Near ground, in leaf litter, in open grassland.

SPECIMENS. Holotype ♂ ANC.

FIG. 345. *Pongah* songs. Scale = 0.5 s.**Pongah ilara n. sp., Fig. 346E**

RANGE. Northcentral coastal QLD.

RECOGNITION. Males: Similar to *P. indooroopilly*, but differing as follows: File with 111 (holotype) and 104 teeth. Cerci dark at base. Subgenital plate rounded, convex at posterior margin. Legs somewhat banded. Femora I and II mostly dark brown but pale at distal end. Tibiae I and II with 2 dark bands, a narrow band proximal to tympanum and a broad central band taking up approximately $\frac{1}{2}$ tibial length. Tibia III with 3 dark bands, two in proximal $\frac{1}{2}$ and one in distal half. Proximal bands most visible on posterior surface. Measurements in Table 44.

Females: Color as in male. Head shape as in male. Head width 2.07 times rostral width; rostral width 3.11 times width of basal antennal segment. Femur III length 1.50 times tibia III length. Ovipositor length 1.19 times pronotal length.

HOLOTYPE. ♂, A-59, Cape Tribulation, QLD, 3 ix 1968, ANC.

SONG. Fig. 345. We did not determine the song of captured males, but believe it might be two-chirp song given below and in Fig. 345.

	p/s	p/tr			kps	°C
		part A	part B			
A-59	47.0	32	5	7.2		
A-33	35.0	22	4	5.7	20	
A-29	46.0	32	5	6.7	18	

HABITAT. Leaf litter in rain forests.

SPECIMENS. Holotype ♂ ANC. A-59 1♀ ANC. A-285 1♂ ANSP.

Genus ARACHNOCEPHALUS Costa

Arachnocephalus Costa 1855: 41. Type species: *Arachnocephalus vestitus*.

Chopard (1968) lists 23 species for this genus which ranges from Africa to Malasia and the Philippines. A single species is reported from Australia.

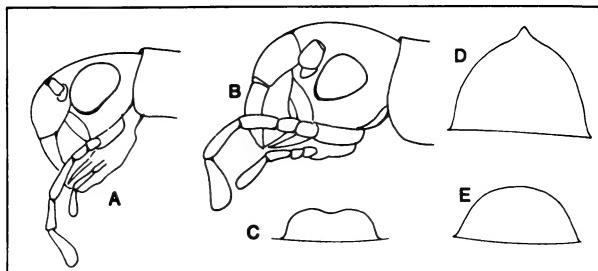


FIG. 346a. *Pongah*. A, *indooroopilly*; B, *ilara*. C-E, male subgenital plates of *indooroopilly* (C), *wanboo* (D) and *ilara* (E).

RECOGNITION. Fig. 346b. Both sexes without FW's. Front tibiae without tympana. Otherwise very similar to *Ornebius* species.

Arachnocephalus australicus Chopard

Arachnocephalus australicus Chopard 1925: 27. Lectotype ♂ here designated, Broome, WA, SM.

RANGE. Not collected by us. Only specimens are recorded from Broome, WA.

RECOGNITION. Fig. 346b. Both sexes lack wings and auditory tympana. Male body length 5.5 mm, female 7 mm. A male from Winning HS, WA, has reddish brown head and pronotum; abdomen dark grey-brown, with each segment bearing pale grey scales along its margin. Genital processes black. Body length ca. 6 mm. Legs and cerci pale brown. Females similar to males in color but slightly larger. Ovipositor 0.8 times as long as femur III. Cerci longer than ovipositor (tips broken).

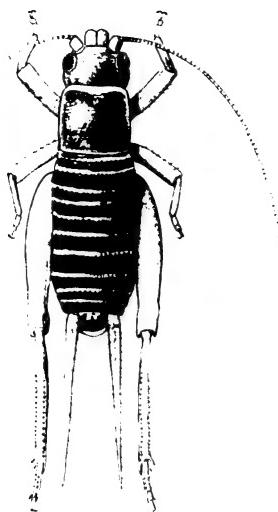


FIG. 346b. *Arachnocephalus australicus* male.

HABITAT. Probably on bushes or tree trunks.

SPECIMENS. Lectotype ♂ SM. Same data as lectotype, 1♀ 3j♀. 6 km N Winning HS, WA, 23.06S 114.33E, 30 iii 1971 (E. F. Riek) 1♂ 1j♀ ANC. 23 km WSW Barradale, WA, 22.56S 114.45E, 30 iii 1971 (E. F. Riek) 1♀ ANC.

SUBFAMILY GRYLLOTALPINAE

The subfamily Gryllotalpinae includes five genera, of which *Neocurtilla* with nine known species, *Scapteriscus* with twelve species, and *Gryllotalpella* with two species, are restricted to the New World. *Gryllotalpa*, with 22 species, is common in Europe south of about 55° North Latitude, and occurs throughout Africa and west across Asia and the Indo-Australian Archipelago to the Caroline Islands and Hawaii (surely introduced there), and to Australia, Tasmania, The Solomons, New Caledo-

nia, and Lord Howe Island. *Triamescaptor*, with a single species, is restricted to New Zealand.

Except for two species of field crickets in the genus *Teleogryllus*, the Gryllotalpinae are the only Australian crickets that have been studied biologically to any degree, and the only group on which previous systematic work has approached a satisfactory state. Tindale (1928), who studied these crickets in the field as well as in the museum, recognized seven Australian species, all in the genus

Gryllotalpa. He provided an adequate key to distinguish them and discussed aspects of the biology and life history of some of the species. Chopard (1968) also recognized seven *Gryllotalpa* species in Australia, but he synonymized one of his own species (*inermis*) about which Tindale had been uncertain (though under *australis* Erichson, not under the species, *pilosipes* Tindale, which it most resembles), and elevated *coarctata* Walker (1869), which Tindale had synonymized. Both changes were made without comment.

Our work indicates that there are more than a dozen Australian species of *Gryllotalpa*. Seven of these we collected and tape-recorded, two were collected only, and three were only examined as museum specimens. Seven trilling songs, one burst-trilling song, and one chirping song, all taped without specimens, suggest as many as 10 species additional to the twelve treated here. Although we cannot be certain that all of these songs were produced by mole crickets, they are well below the frequencies of the songs of other Australian crickets. We have examined the types of all nominal species of *Gryllotalpinae* mentioned for Australia except those of *G. africana* from Africa (apparently lost, L. Chopard, pers. comm.), and *G. australis* Erichson from Tasmania, also apparently lost.

Australian mole crickets all live near water or in moist soils. Tindale remarks that those with glabrous pronota and other body parts are generally found in sand, while the strongly pubescent species are generally found in "light soils." Our observations accord with this suggestion: at least six of the nine localities where we took the two strongly glabrous species, *G. nitidula* and *G. pluvialis*, were quite sandy.

Because of their lack of pronotal pilosity, *G. nitidula* and *G. pluvialis* were placed in a separate genus, *Austrotalpa*, by Mjöberg (1913). Tindale (1928), however, synonymized the genus, noting that one species, *G. australis*, formed something of an intermediate with *Gryllotalpa*; but he also suggested that *G. oya*, *G. nitidula*, and *G. australis* might be included in *Austrotalpa* in a subgeneric sense. Our discoveries that *G. pluvialis* is distinct from *G. nitidula* and that *G. australis*, *G. brachyptera*, and *G. babinda* n. sp. are similar, increase to six the number of species in this general group.

Mole crickets occur everywhere in Australia

where water is found, even inland in remote and tiny desert ponds and waterholes. The two species found abundantly in inland and other xeric locales, *G. monanka* and *G. coarctata*, are similar to one another, and to African specimens identified by various investigators as *G. monanka*. Most individuals are macropterous, and apparently both species are nomadic, many individuals flying to lights. Mole crickets may be unusual among flying crickets because they orient to sounds during flight (Ulagaraj and Walker, 1973). In view of the extreme localization of mole cricket habitats and their largely subterranean existence, this orientation in flight may be as important in finding suitable habitat as in finding mates. The two abundant inland species closely resemble two less common species of xeric locales, *G. pilosipes* and *G. inermis*, whose distinctness is still in question. The remaining six continental species are found only in coastal regions, collectively occurring from tropical and subtropical rain forests of Queensland south to Victoria, and in the Southwest. One *Gryllotalpa* species is known only from Lord Howe Island. Tindale described as a new genus and species, *Triamescaptor aotea*, the apterous species with three dactyls on the foretibiae that is the only mole cricket known from New Zealand. Of all these 12 species, only the Africana Group of *Gryllotalpa* contains species closely resembling the five nominal species from the Indo-Australian Archipelago, with the possible exception of specimens from Papua and New Caledonia listed by Chopard (1968) under *G. australis* Erichson.

Little is known of the seasonal life cycles of Australian mole crickets; if they are like other mole crickets, they probably have 1-2 year life cycles and show some parental behavior (See Alexander, 1968, for references). Tindale (1928) describes the various instars of *G. oya*. He notes that this species, like others in genera such as *Neocurtilla* in North America (Griffith, 1937), is able to eject a sticky liquid from its anal glands upon disturbance. He also indicates that a population of *G. oya* near Adelaide caused significant damage to carnation seedlings in a nursery. Aside from this single instance, Australian mole crickets seem unlikely to be significant pests unless considerable changes occur in Australian agricultural practices.

Male mole crickets sing mostly at night, sometimes also on cloudy afternoons. Rainforest species

in Australia often sing chiefly at dusk, which causes their songs to be even more difficult to distinguish from those of certain cicadas which sing at the same times and also have rather musical, low-pitched songs. Some chirping noises made by night jars or frogmouths (Podargidae) can be confused with mole cricket songs, but after a few repetitions these are generally followed by other more recognizably podargid sounds that do not resemble mole cricket chirps.

Female mole crickets, unlike other crickets, also stridulate (Baumgartner 1905; Tindale 1928), particularly when disturbed in their burrows, and probably in connection with aggressiveness during parental behavior (Alexander, unpubl.). Tindale (1928) twice heard and saw females of *G. oya* stridulating in the laboratory "emitting dull, pulsating sounds clearly audible six feet away, and answering the calls of a male confined in another chamber." As Tindale indicated, females of all Australian *Gryllotalpa* species examined possess a tegminal stridulatory device. This apparatus may be somehow homologous with that of the males since it seems to involve the same wing vein.

Mole crickets living in rain forests are often difficult to locate and capture, partly because they sing for such brief periods early in the evening, partly because only one or a few males may be heard in a given locale for most months of the year, and partly because attempts to approach a singing male in heavy vegetation or similar situations are likely to cause him to stop singing and retreat into his burrow. Two of our unsuccessful attempts to capture unique singers near Babinda, Queensland, involved crawling into grottoes washed out several meters deep under masses of roots formed by trees in the rain forest along a stream. Both males stopped singing before we could find their burrow entrances after severing roots and wriggling into the grotto, and subsequent digging where we thought the burrow was located proved fruitless. Tindale and others have captured mole crickets by bailing water from a stream up on the bank where mole cricket burrows are abundant until the crickets emerge, but this method is most useful for obtaining large series of specimens of species that occur in great numbers. A shovel can also be used effectively in such circumstances, and in fact is an almost indispensable tool for collecting mole crickets.

We collected 60 mole crickets and tape-recorded 50 individuals, taking data from 50 localities; seven species are represented in our collections and seven species on the tapes. Three of the known species, *G. brachyptera*, *G. pilosipes*, and *G. inermis*, were not encountered in the field. Some of the ten tape recordings that we attribute to mole crickets, but for which we lack specimens, are described in Table 45 and Figs. 350, 351.

Genus **GRYLLOTALPA** Latreille

Gryllotalpa Latreille 1802: 275. Type species: *Gryllus Acheta gryllotalpa* Linnaeus 1758: 428, Europe, by tautonymy, also selected by Kirby, 1906.

Curtilla Oken 1815: 445. Type species: Same as above.

Austrotalpa Mjöberg 1913: 30. Type species: *A. pluvialis* Mjöberg 1913: 30, Queensland, "Blackal Range," by monotypy.

RECOGNITION. Members of this genus may be distinguished from the other four world genera of mole crickets by the following combination of characters: four dactyls on foretibiae, six or fewer apical spurs on hind tibiae, and tympanal openings on foretibiae kidney-shaped.

The Australian species can be arranged into 5 distinguishable species groups.

Monanka Group

1. Ocelli large (Fig. 355AB).
2. FW's unicolorous pale brown (Fig. 353BC).
3. Pronotum velvety.
4. Inner subapical spurs on tibia present (Fig. 354M).
5. FW more than 0.75 times as long as pronotum.

Pilosipes Group

1. Ocelli large (Fig. 355E).
2. FW's unicolorous pale brown (Fig. 353E).
3. Pronotum velvety.
4. *Inner subapical spurs absent* (Fig. 354N).
5. FW more than 0.75 times as long as pronotum.

Australis Group

1. Ocelli small (Fig. 355DF).
2. FW's patterned (Fig. 353FJK).
3. Pronotum velvety.
4. Inner subapical spurs present.
5. FW more or less than 0.75 times as long as pronotum.

Nitidula Group

1. Ocelli small (Fig. 355C).
2. FW's patterned (Fig. 353GH).
3. *Pronotum smooth and shiny*.
4. Inner subapical spurs present.
5. FW more than 0.75 times as long as pronotum.

Oya Group

1. Ocelli absent (Fig. 355G).
2. Forewings?

TABLE 45. Songs of species not collected and presumed to be *Gryllotalpa*.

	p/s	ch/s	p/ch	kps	°C
A-39	95.0–102.6	2.5–3.0	21–23	2.3–2.4	21
A-128	107.5	1.9	28–45	2.1	27
A-850	73.0–77.8	irregular ca. 6	1–8	2.7	21

3. Pronotum sparsely haired.
4. Inner subapical spurs present.
5. FW less than 0.75 times as long as pronotum.

MONANKA GROUP

The group includes two species, *G. monanka* and *G. coarctata*, which are very difficult to distinguish morphologically. At present males can be distinguished by song, file count, and spacing of file teeth; but females are indistinguishable. We have determined females mainly by associating them with males collected at the same place and time.

This group differs from the Pilosipes Group mainly in possessing a row of inner subapical spurs (lacking in the latter); and from the other 3 groups in possessing large lateral ocelli (Fig. 355AB).

monanka

1. File with 21–43 teeth.
2. File with 6–13 teeth/mm near center.

coarctata

1. File with 39–77 teeth.
2. File with 13–18 teeth/mm near center.

Gryllotalpa monanka n. sp., Figs. 352, 353B, 354AP, 355AHJK

Chopard placed the members of this species under *Gryllotalpa africana*. B. Townsend of the British Museum who is studying African gryllotalpines sent us specimens from South Africa he confidently believes belong to *G. africana* (the types are lost). Although *G. africana* and *G. monanka* are superficially close, their genitalia are quite different, at least as different as the most divergent species within Australia.

RANGE. Widespread through northern Australia.

RECOGNITION. Very difficult to distinguish from its sibling, *G. coarctata*. Males of the two species differ principally in number and spacing of file teeth. File with 21–43 teeth spaced at 3–4 teeth/0.33 mm at center (50–77 in *G. coarctata* spaced 5–8

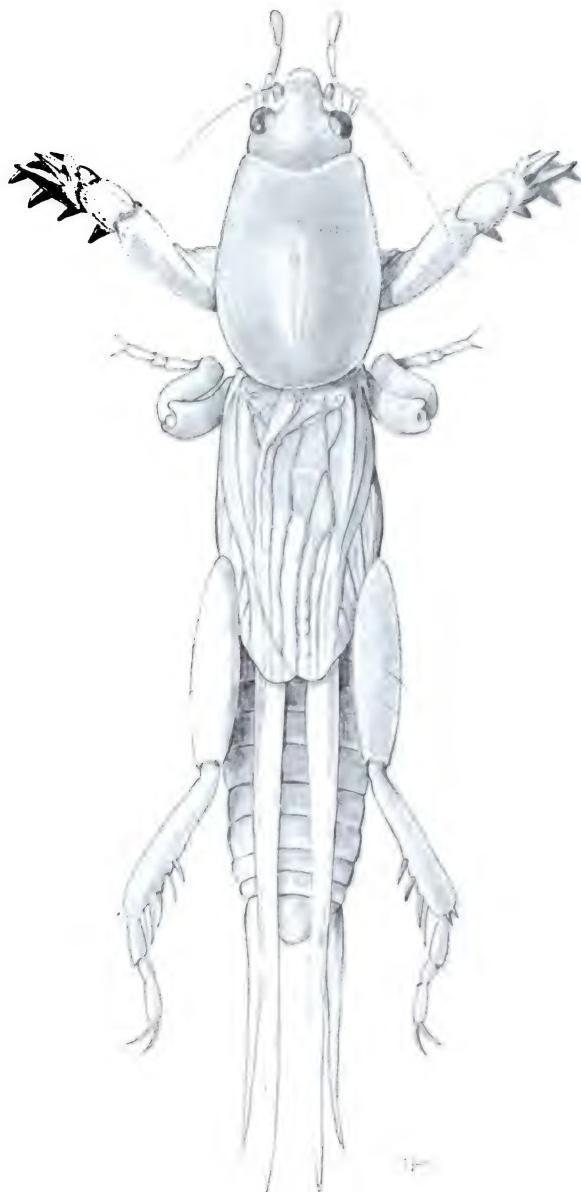


FIG. 347. *Gryllotalpa coarctata* female.

teeth/0.33 mm at center). Both species differ from *G. inermis* and *G. pilosipes* in having row of inner subapical spurs which are lacking in latter two species. They differ from most of *Gryllotalpa* species in having HW's extend much beyond FW's (HW's very tiny or absent in other species), and in lacking patterned brown pigmentation on FW's. Genitalia of *G. monanka* and *G. coarctata* indistinguishable as are forelegs and FW's.

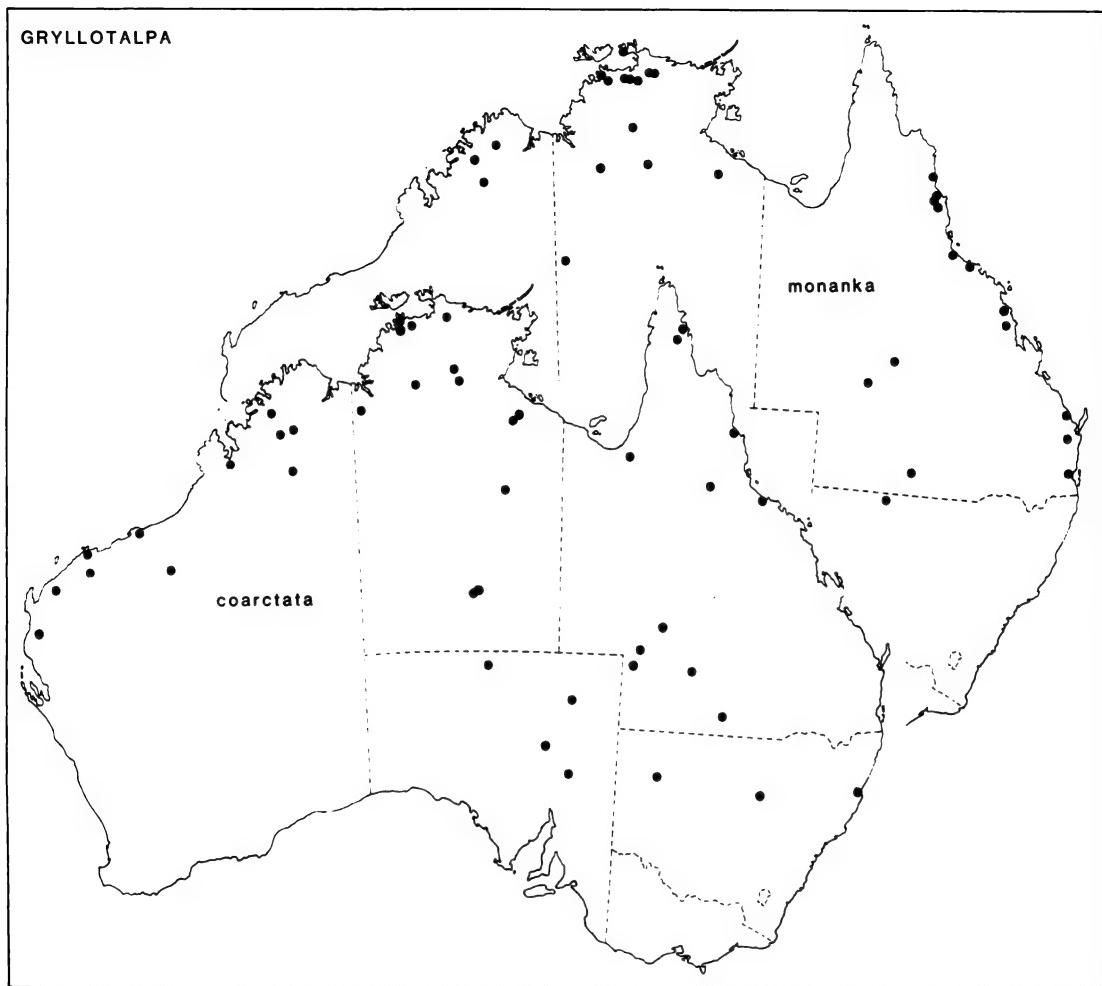


FIG. 348. Distributions of *Gryllotalpa monanka* and *G. coarctata*.

HOLOTYPE. ♂, A-4, Townsville, QLD, 18–21 vii 1968, ANC.

SONG. Fig. 350. Also most like that of *G. coarctata*, most often more or less continuous trill with pulse rate near 68 pulses per second and frequency of 1.5 kilohertz at 24°C. Sometimes males trill in bursts that may be long or short, irregular or regular in length. Occasionally one hears male change from one kind of singing to another, and sometimes softer, slower trills are heard in colonies. We presume latter trills are produced either by courting males or by females, as similar relationship between calling and courting exists in American mole cricket, *Neocurtilla hexadactyla* (Perty) (Alexander, unpubl.).

The very low pitch of the song of *G. monanka*,

the distinctiveness of the song in this regard from that of its close relative, *G. coarctata*, and the remarkably wide spacing of the file teeth all suggest that selection has directly favored frequency (kilohertz) differences between the songs of these two species. Although frequency differences, slight or great, are the rule rather than the exception between cricket species, such divergence is probably not favored directly in most cases but is an incidental effect of reproductive isolation and selection acting in other regards. This argument is contrary to suggestions in the literature, for example involving *Teleogryllus commodus* and *T. oceanicus* (Hill, Loftus-Hills, and Gartside 1972).

Because cricket auditory organs are rather finely

tuned to the particular frequency of their own songs, slight differences in frequency matched by auditory organ tuning difference do not necessarily suggest selection resulting from confusing interaction. The question is a difficult one to answer. Simultaneous tape recordings of *G. monanka* and *G. coarctata* (e.g., at Howard Springs near Darwin, A-133) show that the pulse rates are 94 and 78/s (26°C), and the frequencies are non-overlapping, centering, respectively, at 1.8 and 2.8 kilohertz. Fig. 351 confirms that frequencies, in these songs, are at least as different as pulse rates, an unusual situation between sibling species. Fig. 352 shows that the stridulatory files of *G. monanka* and *G. coarctata* do not overlap in regard to widest spacing of teeth, and barely overlap in length of toothed portion of the file. It is unusual for sibling species to differ so much in file tooth spacing, further evidence that selection has favored divergence in song frequencies. It appears that song frequency in one or both songs has been changed chiefly by an alteration of tooth spacing, with a relatively slight accompanying change in speed of wingstroke. As a result, the length of the wing stroke and the length of the stridulatory file have also changed relatively little.

In any case, we suggest that *G. monanka* and *G. coarctata* exhibit sufficient, apparently ancient sympatry; they have songs so far apart in frequency; and *G. monanka* has such an extraordinary file, as to indicate that selection for frequency differences has occurred. We believe this to be the first case among crickets in which such an hypothesis is warranted.

		p/s	kps	°C
A-4	n=3	67-76	1.6-1.7	22
A-20		54	1.1	21
A-27		76.9	1.7	21
A-34		84	2.0	23
A-133		94	1.8	26
A-146		105	1.8	26
A-264	n=5	77.5-85.4	1.5-1.85	21
A-286		92	2.1	24-27
A-362		66-69.5	1.5	22-23
A-434		86.5	1.7	23
A-481	n=2	102, 108	1.5, 1.6	22
A-538	n=3	78-108	2.0-2.1	24
A-780	n=2	96	1.8, 1.9	23
A-782	n=2	73, 75	1.6, 1.7	23
A-344		88	1.6	20

HABITAT. Within Australia, *G. monanka* and *G. coarctata* are the most abundant and widely distributed mole crickets, ranging from the eastern coast in such xeric locales as Townsville, Queensland, west along stream banks and across the center of the continent in tiny desert waterholes and billabongs to the west coast at Broome and Derby. Almost anywhere that one finds water *G. monanka* and *G. coarctata* begin their dull, guttural trills at dusk; in most localities, along with the chirps and short trills, respectively, of the two widely distributed species of *Lepidogryllus*. Males generally have their burrows very close to the water's edge, sometimes beneath boulders or debris which may amplify the sound tremendously and give it a directional or ventriloquistic quality. Although our data are far from complete, they indicate that *G. monanka* breeds more or less continuously in tropical and subtropical localities and does not extend into extreme southwestern and southeastern Australia or Tasmania where winters are more pronounced. In these regions *G. coarctata* apparently occurs without *G. monanka*. A song tape from Kingston, South Australia, indicates that *G. monanka* reaches the south coast in the center of the continent.

SPECIMENS. Holotype ♂ ANC. A-4 1♂ ANC. A-5 1♂ ANC. A-14 3j ANC. A-27 1♂ ANC. A-31 1♂ UM. A-34 1♂ ANC. A-55 1♂ ANSP. A-115 1♀ ANC. A-130 2j ANC. A-133 1♂ ANC. A-139 3♂ ANC. A-144 1♂ ANC. A-782 1♂ ANC. QUEENSLAND: Malanda, 2 xi 1962 (Hayley) 1♀ ANC. Mackay (airfield), 21 v 1971 (Vestjens) 2♀ ANC. 27 km S by E Cunnamulla, 24 iii 1972 (Lewis) 1♂ ANC. Bundaberg, iv 1971 (Frauca) 2♂ 5♀ ANC. 35 km NNW Croydon HS, S of Sarina, 30 x 1973 (Shaw, Freeman) 1♂ ANC. Lovat Sta., 35 km SE by E of Ilfracombe, 17 iii 1971 (Davies) 1♂ 6♀ ANC. Boomaroo Sta., 40 km E Stonehenge, SW Longreach, 25 ii 1971 (Davies) 1♂ ANC. Brisbane, 24 x 1935 (Ashby) 1♂ ANC. Camp Milo, Cooloola National Park, 16-20 x 1978 (Rentz, Balderson) 1♂ 10♀ ANC. NORTHERN TERRITORY: Tindal, 8 mi ESE Katherine, 4 xii 1967 (Vestjens) 2♂ 2♀ ANC. Same place, 1-20 xii 1967 (Vestjens) 1♂ 1♀ ANC. 19.58S 129.39E, Camel Waterhole, vii-ix 1971 (Hodgson) 1♂ 1♀ ANC. Katherine, 17-18 viii 1973 (Kelsey) 1♂ 1♀ ANC. 12.20S 133.19E, Nabarle Dam, 15 km S by W of Nimbuhaw Rock, 2 vi 1973 (Key) 1♂ ANC. 6.4 km WSW Victoria River Downs, 13 vi 1973 (Kelsey) 1♂ 3♀ ANC. 7 km NW by N Cahills Crossing, East Alligator River, 4 xi 1972 (Key) 1♂ ANC. km N Cahills Crossing, East Alligator River, 31 x 1972 (Key et al.) 1♂ ANC. 12.40S 132.54E, Magela Ck, 9 km SSE Mudginbarry HS, 7 xi 1972 (Upton) 2♂ 1♀ ANC. Nourlangie Ck, 8 km N Mt Cahill, 26 x 1972 (Key) 5♂ 1♀ ANC. 18 km E by N of Oenpelli, 1 vi 1973 (Key et al.) 1♂ ANC. 31 km WSW Borroloola, 15 iv 1973 (Key et al.) 3♂ ANC. 16.06S 133.04E, Cooper Creek, 19 km E by S Mt. Borradale, 2 xi 1972 (Key) 1♂ ANC. 12.17S 133.20E, Cooper

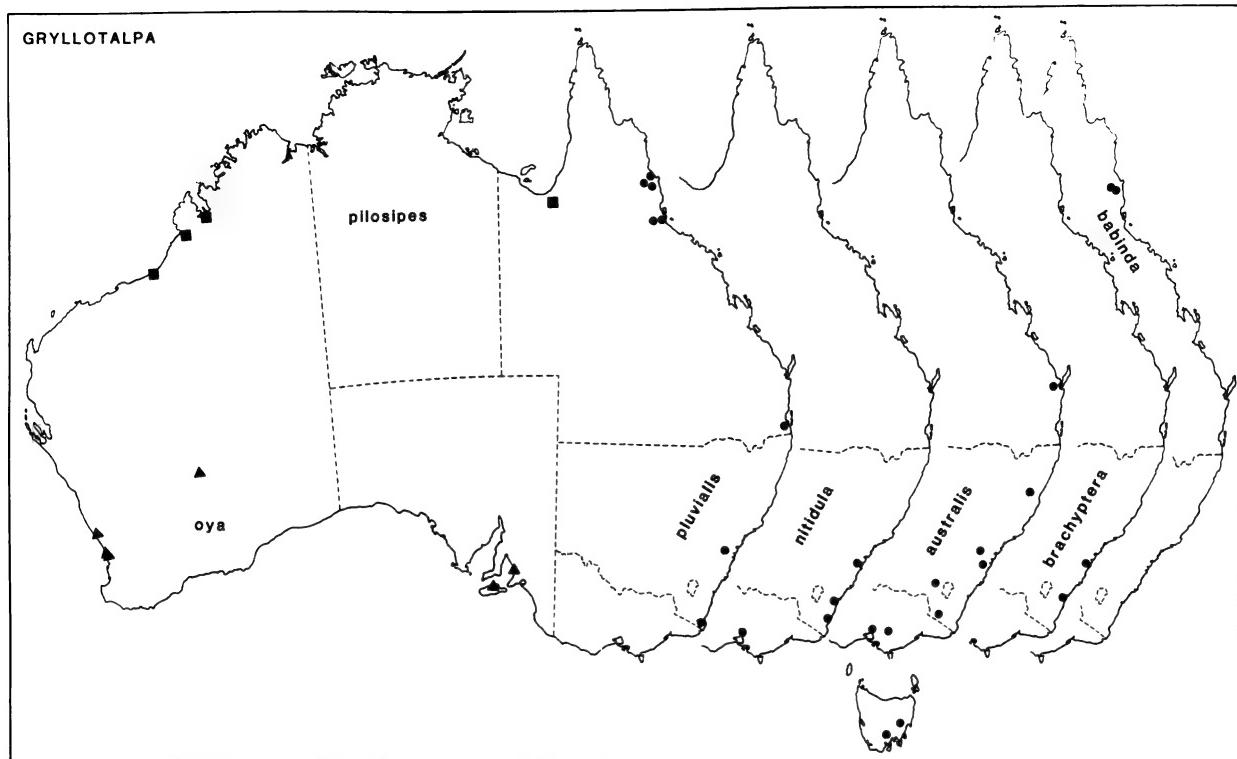


FIG. 349. Distributions of *Gryllotalpa* species.

Creek, 11 km S by W Nimbuwah Rock, 3 vi 1973 (Upton, Feehan) 1♀ ANC. Smith Point, Cobourg Peninsula, 16 i-21 ii 1977, 4♂ 6♀ ANC. WESTERN AUSTRALIA: 15.19S 126.32E, Old Doongan, Kimberley district, 2 viii 1975 (Common, Upton) 2♂ ANC. Prince Regent River Reserve, 20 viii 1974 (Bailey, Richards) 1♂ ANC. NEW SOUTH WALES: 45 km ESE Hungerford (QLD), 15 xi 1971 (Lewis) 1♂ ANC.

***Gryllotalpa coarctata* Walker, Figs. 347, 352, 353CD, 354BM, 355BL**

Gryllotalpa coarctata Walker 1869: 6. Lectotype here designated: a female in the British Museum from "N. Austr." bearing the numbers 57 and 134 (round blue label), the handwritten label "Gr. coarctata," and (Kirby's?) label "One of Walker's series so named."

LECTOTYPE DESCRIPTION. Very dark-colored, dusty or moldy-appearing female; tegmina exposing about 6 abdominal tergites; hind wings extending just beyond tip of abdomen; rear ocelli slightly elongated and quite obvious; pronotum pubescent; anterior tarsus pubescent as in Tindale's figure 4E. Body length, ca. 21 mm; FW length, 11.1 mm; pronotal length, 7.3 mm; pronotal width, 5.8 mm; length of femur III, 8.0 mm; length of tibia III, 5.9

mm; length of HW's exposed beyond FW's 13.9 mm; cercal length, slightly over 13.0 mm.

RANGE. Widespread over Australia except southwestern WA.

RECOGNITION. Almost indistinguishable from *G. monanka* but males with 42-77 file teeth spaced at 5-8 teeth/0.33 mm at center (21-53 in *G. monanka* spaced at 3-4 teeth/0.33 mm at center). Females of these two species not yet distinguishable. *G. coarctata* and *G. monanka* differ from presumed close relatives *G. inermis* and *G. pilosipes* in having row of inner subapical spurs (lacking in latter two species). They differ from all other species in being macropterous and in lacking patterned FW's.

Because specimens of this species are distinguished from *G. monanka* solely on characteristics of the male stridulatory file, we cannot of course be certain that our specimens belong to the same species as the lectotype female of *G. coarctata*. Aside from general similarity of appearance between the lectotype and our male from the Flinders Ranges, the presumption of conspecificity is based on the "N. Austr." locale for *G. coarctata*, which

in 1869 likely referred to the region north of Adelaide. The stridulatory file of the male from the Flinders Ranges (A-408) is 2.7 mm long with 59 teeth, spaced 8/0.333 mm near the center. Unless contradictory information becomes available, it seems reasonable to avoid adding another name to the literature.

This species and *G. australis* are apparently the only mole crickets in extreme southeastern and southwestern Australia and Tasmania.

SONG. Fig. 350. See discussion of song under *G. monanka*.

	p/s	kps	°C
A-13	66.5	2.6	24
A-28 n=2	68.0, 69.5	2.15	18
A-44	50.0	2.2	21
A-46	47.0	1.9	22
A-115	69.1	2.5	26
A-130	89.0	2.9	27
A-135	59.8	2.4	28
A-142	77.1	2.6	25
A-166 n=2	53.9, 55.1	2.1, 2.7	29
A-172	58.8	1.9	24
A-256 n=2	66.0, 66.7	2.1, 2.5	24
A-408	51.5	2.2	31
A-713	59.3	2.6	26
A-767	55.0-73.0	2.0-2.2	23
A-782 n=3	54.0-55.0	2.05-2.35	23
A-879 n=3	51.5-52.0	1.8-2.1	23?
A-481	61.3	2.1	22

HABITAT. See under *G. monanka*.

SPECIMENS. Lectotype ♂ BM. A-85 3♂ 3♀ ANC. A-118 1♀ ANC. A-135 2♂ UM. A-144 1♂ ANC. A-308 1♂ 2♀ ANC. A-335 1♂ ANC. A-408 1♂ ANC. A-690 1♂ ANSP. A-767 1♂ ANC. A-816 1♂ ANC. A-890 1♂ ANC. NEW SOUTH WALES: Calindary Stn, NW of White Cliffs, 8 vi 1969 (Stanger) 1♂ ANC. WESTERN AUSTRALIA: 20.42S 116.43E, 4 km SSE Dampier, 18 x 1970 (Upton, Feehan) 1♂ ANC. Hann River, 10 mi SW Gibb River HS, 25 x 1969 (White, Marginson) 1♂ ANC. Prince Regent River Reserve, 15-23 viii 1974 (Bailey, Richards) 6♂ 7♀ ANC. Vicinity of Millstream HS, 20 x 1970 (Upton, Feehan) 11♂ 9♀ ANC. Minilya River, 4 km NE by E of Minilya HS, 23.49S 114.00E, 29 iii 1971 (Upton, Mitchell) 1♀ ANC. Red Bluff, WNW of Ajana, 5 xii 1971 (McFarland) 1♂ ANC. QUEENSLAND: 27 km S by E of Cunnamulla, 24 iii 1972 (Lewis) 4♂ 1♀ ANC. Jundah, 7 iv 1970 (Lewis) 1♂ ANC. 29 km W Gilpeppie O.S., near Lake Yamma Yamma, 23 iii 1972 (Lewis) 1♂ ANC. 3 km NE Tanbar HS, SW of Windorah, 6 iv 1970 (Lewis) 3♂ 1♀ ANC. 3-5 km W of Bundeena HS, SW of Quilpie, 12 ii 1972 (Lewis) 1♂ 1♀ ANC. NORTHERN TERRITORY. 19.24S 135.58E, 15 km SW Alroy Downs HS, 10 iv 1976 (Key et al.) 1♂ 1♀ ANC. 16.47S 135.45E, McArthur River, 14 km S by W Cape Crawford, 25 x

1975 (Upton) 1♂ ANC. 23.38S 133.53E, Junction Waterhole, Todd River, 9 km N by E Alice Springs, 28 ix 1978 (Rentz) 1♀ ANC. Goose Lagoon, 11 km SW by S of Borroloola, 17 iv 1976 (Key et al.) 1♂ ANC. SOUTH AUSTRALIA: 27.43S 138.44 E, 1 km N of Mirra Mitta Bore, N by E of Mungeranie HS, 18 ix 1972 (Key) 2♂ 1♀ ANC. 26.20S 134.56E, 2 km SW of Mt. Barr, SSE of Abminga, 25 ix 1972 (Key et al.) 1♂ 1♀ ANC. 29.36S 137.26E, 36 km ESE Curdimurka, 21 ix 1972 (Key et al.) 1♂ ANC.

PILOSIPES GROUP

Two species belong to this group although the status of *G. inermis* remains doubtful (see discussion below). The group possesses large ocelli as in the Africana Group, but both species lack inner subapical spurs.

Gryllotalpa pilosipes Tindale, Figs. 353E, 354DN, 355E

Gryllotalpa pilosipes Tindale 1928: 16. Holotype ♂, Derby, NW Australia (W. D. Dodd) SAM.

RANGE. Lower Gulf of Carpentaria and northwestern WA.

RECOGNITION. Holotype is pinned through right tegmen, stridulatory file destroyed. Resembles *G. monanka* and *G. coarctata*, but smaller and paler. Differs from its most similar relatives in having six apical spurs and no subapical spurs. All known specimens macropterous. We cannot be certain that *G. pilosipes* and *G. inermis* are distinct from *G. monanka* and *G. coarctata*. Variations in tibial armature may occur within species occasionally, and we have no certain song records. Furthermore, *G. monanka* was taken with *G. pilosipes* at first two localities listed above.

SONG. Not known.

HABITAT. Similar to *G. monanka*.

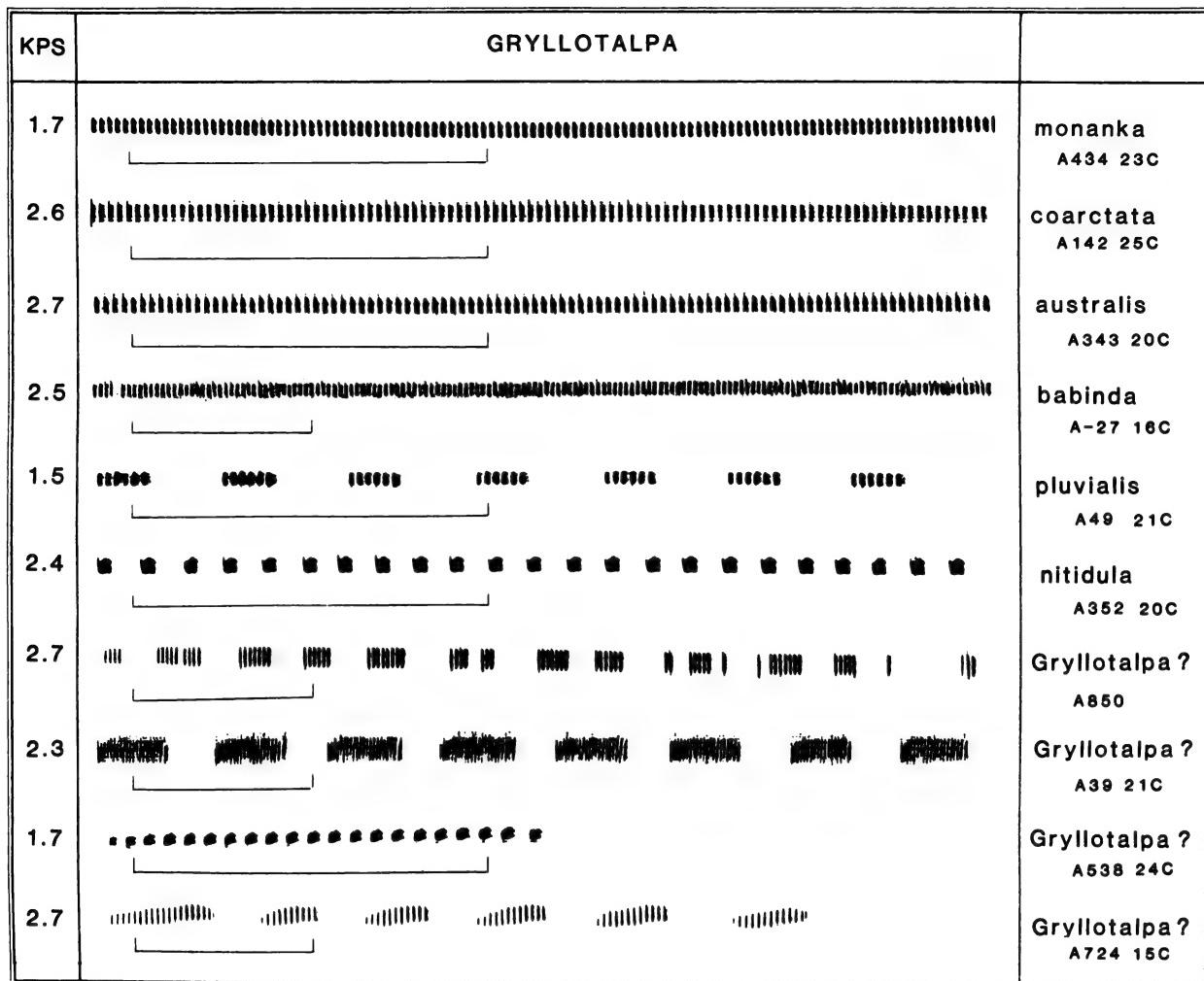
SPECIMENS. Holotype ♂ SAM, paratype ♀ SAM. WESTERN AUSTRALIA: 2 mi NNW of Mandora HS, SSW of Broome, 17 iv 1963 (Chinnick) 3♀ ANC. 25 mi ESE Broome, 16 iv 1963 (Chinnick) 1♀ ANC. QUEENSLAND: 3 mi S Normanton, 9 iv 1962 (Key, Corby) 1♀ ANC.

Gryllotalpa inermis Chopard

Gryllotalpa inermis Chopard 1925: 30. Holotype ♀, Victoria, PM.

RANGE. Type locality in VIC.

RECOGNITION. Holotype uniformly pale, resembling type of *G. pilosipes* except for having only two external apical spurs on tibia III which are an-

FIG. 350. Songs of *Gryllotalpa* species. Scale = 0.5 s.

terior. Right antenna missing; macropterous; tarsus I has greater portion hirsute than in holotype of *G. pilosipes*; terminal half of external apical spurs on tibia III dark and shiny, basal half of two longer ones setose and pale.

This unique specimen differs in the armature of the hind tibia from those assigned to *G. pilosipes*, and is recorded from Victoria, which is diagonally across the Australian continent from most specimens of *G. pilosipes* (Derby-Broome area), and across the continent from north to south from the single specimen of *G. pilosipes* recorded from outside the Derby-Broome area (Normanton, Queensland). On this basis, there seems to be no good rea-

son for synonymizing the name even though we heard no distinctive songs in Victoria which could represent this species. Tindale (1928) was uncertain about *G. inermis*, not having seen the type, and Chopard (1968), who had apparently not seen a specimen of *G. australis*, synonymized it under that quite dissimilar species.

SONG. Not known.

HABITAT. Probably similar to *G. monanka*.

SPECIMENS. Holotype ♀ PM.

AUSTRALIS GROUP

This group presently includes three species, *G. australis*, *G. babinda*, and *G. brachyptera*. The

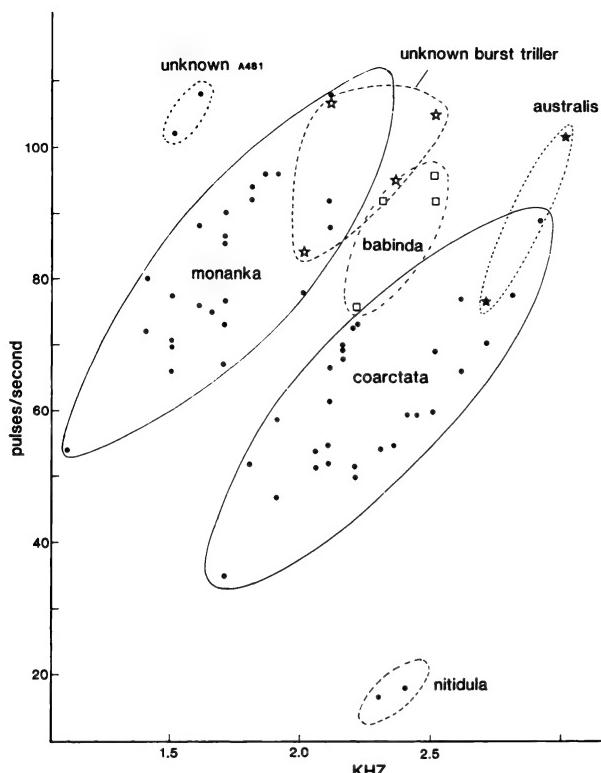


FIG. 351. Scatter diagram of song parameters in *Gryllotalpa* species.

group differs from the Monanka Group in having dark pigment on the FW's (Fig. 353FJK) as well as in male genitalia; from the Pluvialis Group in having a velvety pronotum and head (shiny in the Pluvialis Group); and from the Oya Group in possessing lateral ocelli.

KEY TO SPECIES OF AUSTRALIS GROUP

1. Male FW less than 0.75 times as long as pronotum. Body length less than 27 mm. Genitalia as in Fig. 355S. (NSW) *brachyptera*
- FW more than 0.75 times as long as pronotum. Body length 30 mm or more 2
2. File with 48–75 teeth. Genitalia as in Fig. 355QR. (TAS, VIC, NSW) *australis*
- File with 101–113 teeth. Genitalia as in Fig. 355N. (QLD) *babinda*

Gryllotalpa australis Erichson, Figs. 353K, 354GK, 355DQR

Gryllotalpa australis Erichson 1842: 249. Type locality, Woolnorth, Tasmania. Type evidently lost. Neotype ♂, A-427, Mount Donna Bouang, ca. 12 miles N of Warburton, VIC, 3 ii 1969, ANC.

Whether the Tasmanian and mainland populations are conspecific remains to be determined. The Tasmanian specimens have fewer file teeth suggesting a faster pulse rate, but morphologically they are so similar that we do not feel justified in considering them different species.

RANGE. Extreme southeastern Australia and Tasmania.

RECOGNITION. Males: Dorsum of head usually dark brown to blackish. Pronotum variable, medium brown to dark brown. Dorsum of FW's usually blackish in front of stridulatory vein, in chordal area, and at anterior part of apical region. Lateral field of FW's blackish below upper longitudinal veins and with smaller black mark near pronotum. Dorsum of abdomen dark brown to blackish. Venter of abdomen yellow-brown to rusty brown. All males examined lack long HW's (present in females). FW venation as in Fig. 353K. File with 48–88 teeth. File counts vary as follows: Bowraville, NSW (88 teeth); A-427 (70); ACT (88, 72); Unley Rd, SA (67); Stanthorpe, QLD (74); TAS (48, 50, 56). Body length 23–32 mm.

Females: Generally similar to males but dorsum of FW's largely black. Usually with lateral pale lines, one running along each dorso-lateral margin. Lateral field of FW mostly blackish but pale brown or greyish along lower and anterior parts; lower anterior area with a black marking next to posterior edge of pronotum. Body length 25–36 mm; pronotal length 8–11.5 mm; FW length 12–17 mm. All females examined had HW's extending beyond end of abdomen.

SONG. Fig. 350. Recorded only in VIC and NSW. Smooth low pitched trill.

	p/s	kps	°C
A-343	77	2.7	20
A-427	102	3.0	?

HABITAT. Lawns, moist pastures, and moist roadside ditches.

DISTRIBUTION. We collected no mole crickets in Tasmania, and Tindale (1928) and Chopard (1968) list only this species from there. Tindale also records this species from the vicinity of Adelaide, and from various localities between Melbourne and north Queensland, and in Papua. We recorded two different songs from crickets belonging to this group

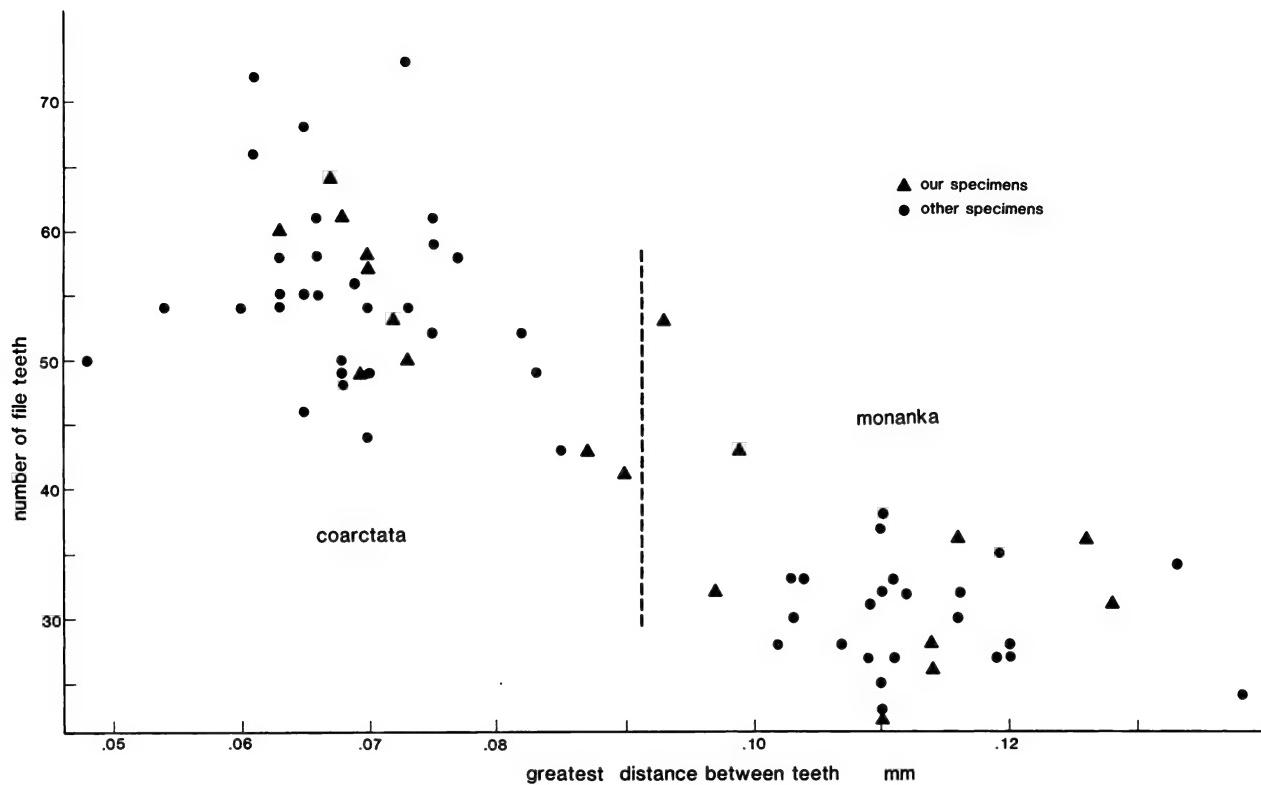


FIG. 352. Scatter diagram of stridulatory file measurements in *G. monanka* and *G. coarctata*.

between Melbourne and Babinda, Queensland, however, and found that stridulatory file differences correlate with the song differences. We taped only one mole cricket song at Launceston, Tasmania, apparently *G. coarctata*. Tasmanian specimens of *G. australis* are smaller than mainland specimens.

The A-427 ♂ has 70 teeth on the stridulatory file spaced 7/0.333 mm near the center. Its song, taped at an unrecorded temperature, has a more rapid pulse rate and higher frequency than other *G. australis* or *G. babinda* (102 pulses per second, 3.0 kHz). This specimen poses some questions, but they cannot be answered without further data, and we choose to consider it conspecific with *G. australis* until further material is available.

SPECIMENS. A-427 ♂ ANC. A-303 ♂ ANC. A-315 ♂ ANC. NEW SOUTH WALES: Pilot Hill, Bago Forest, Batlow, 12 iii 1957 (Campbell) 1♀ ANC. Mt. Keira, near Wollongong, i 1970 (Britton et al.) 1♀ ANC. Bombala, ix 1949 (Carne) 1♀ ANC. Bowravilla Nature Reserve, 3.5 km N Bowravilla, 30 iii 1977 (McInnes) 1♂ ANC. TASMANIA: Lake Leake, 2000 ft, 27 ii 1963 (Common, Upton) 3♂ ANC. Mt. Wellington, 850 ft, 14 iii 1963 (Mollison) 1♀ ANC. AUSTRALIAN CAPITAL TERRITORY:

Lee's Creek Valley, 26 xi 1961 (Key) 1♀ ANC. Black Mtn, 5 ii 1962 (Gough) 1♂ ANC. Same place, 14 iii 1969 (Common) 1♀ ANC. Same place, 25 x 1965 (Common) 1♀ ANC. Canberra, 11 ix 1966 (Monaghan) 1♂ ANC. Same place, 25 iii 1953 (Common) 1♀ ANC. Same place, no date (White) 1♂ ANC. Same place, 27 i 1967 (Key) 2♀ ANC. Same place, 28 viii 1965 (Strautmanis) 1♀ ANC. 1 km NE Smokers Gap, ca. 1200 m, 26 xii 1971 (Balderson) 1♀ ANC. SOUTH AUSTRALIA: Unley Road, 6 v 1946 (Cane) 1♂ ANC. QUEENSLAND: Fletcher, near Stanthorpe, 30 iii 1966 (Campbell) 1♂ ANC.

Gryllotalpa brachyptera Tindale, Figs. 353J, 355FS

Gryllotalpa australis brachyptera Tindale 1928: 11. Holotype ♀, Sydney, NSW, SAM.

RANGE. Extreme southeastern NSW.

RECOGNITION. Generally similar to *G. australis* but FW's less than $\frac{3}{4}$ length of pronotum; ocelli tiny, barely visible; body length 22–27 mm. Dorsum of head and pronotum mahogany brown to dark brown. Dorsum of abdomen dark brown to black. Venter of abdomen dark brown. FW venation and coloration as in Fig. 353J. Two males from Broulee, NSW, have 71, 81 teeth, male from Narrara, NSW,

has 77 teeth. Male genitalia as in Fig. 355S. Body length 22–27 mm; pronotal length 7–8.5 mm; FW length 5–6 mm.

SONG. Not known.

HABITAT. Not known.

SPECIMENS. Holotype ♀ SAM, NEW SOUTH WALES: Campbelltown, 1♀ AM. 35.51S 150.11E Broulee, 5 i 1978 (Key) 1♂ ANC. Broulee I, 14 ii 1972 (Waterhouse) 1♂ ANC.

Gryllotalpa babinda n. sp., Figs. 353F, 354CJ, 355N

RANGE. Northern coastal QLD.

RECOGNITION. Very similar to *G. australis* from more southern regions. Differs in male genitalia (Fig. 355N), shape of first tarsal segment of leg I, and in having more numerous file teeth (101–113 teeth vs 48–88 in *G. australis*). FW venation as in Fig. 353F. Body length of males 25–30 mm. HW's not extending beyond FW's. Holotype measurements: Body length 29.8 mm; pronotal length 7.8 mm; FW length 8.3 mm; cerci 10.2 mm; femur III 6.9 mm; tibia III 5.5 mm. File with 113 teeth spaced at 9/0.33 mm near center and separated by less than a tooth's diameter.

HOLOTYPE. ♂, A-27, The Boulders, 4 miles west of Babinda, QLD, 2 ix 1968, ANC.

SONG. Fig. 350. Loud smooth trill. Does not appear to differ greatly from that of *G. australis*. Further study of songs and distributions of these two species obviously needed.

	p/s	kps	°C
A-27	60, 72	2.5	24

HABITAT. Two males collected in a forest clearing. At three localities (A-27, A-49, A-56), including the type locality, we taped a song very similar to the trill of *G. babinda* from treetops in rain forests. We were never able to locate any arboreal crickets to which to attribute this remarkable low-pitched trill, quite unlike the songs of other arboreal crickets, even by listening and examining foliage in large numbers of trees felled during road construction through rain forest south of Cooktown. Trees were examined that had been felled the same day, one day previously and two days previously. We speculate that mole crickets may sometimes breed, or at least sing, from masses of epiphytes and detritus-filled forks in large, old trees in rain forests. We heard this song regularly and abundantly from

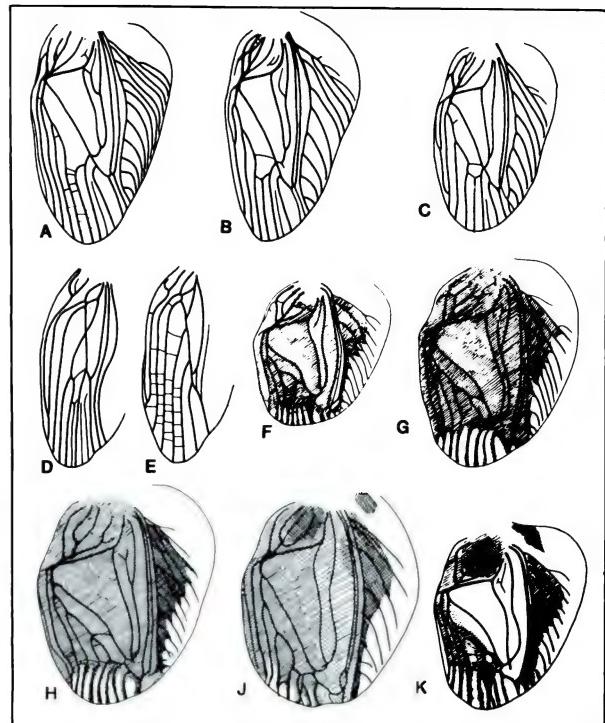


FIG. 353. Forewings in *Gryllotalpa*. A, *africana* ♂ Natal, South Africa; B, *monanka* ♂ Queensland; C, *coarctata* ♂; D, *coarctata* ♀; E, *pilosipes* ♀; F, *babinda* ♂; G, *pluvialis* ♂; H, *nitidula* ♂; J, *brachyptera* ♂; K, *australis* ♂.

trees in many such localities where it was not actually taped. The alternative to our interpretation is that we failed to locate an unusual, large arboreal cricket.

SPECIMENS. Holotype ♂ ANC. A-27 1♂ ANC. Palmerston Nat. Park, Tully-Cairns power line at light in rain forest, QLD, 6 xi 1966 (Britton) 1♀ ANC.

PLUVIALIS GROUP

This group with two species differs from all others in having the pronotum smooth and shining. FW coloration very similar to Australis Group with light and dark areas on dorsal field, blackish or dark brown on upper side of lateral field, and with a smaller brown spot near lower anterior end of lateral field next to pronotum.

pluvialis (eastern QLD)

1. File with 51–68 teeth (n=5).
2. Genitalia as in Fig. 355M.

nitidula (southeastern NSW, eastern VIC)

1. File with 77, 80 teeth (n=2).
2. Genitalia as in Fig. 355OP.

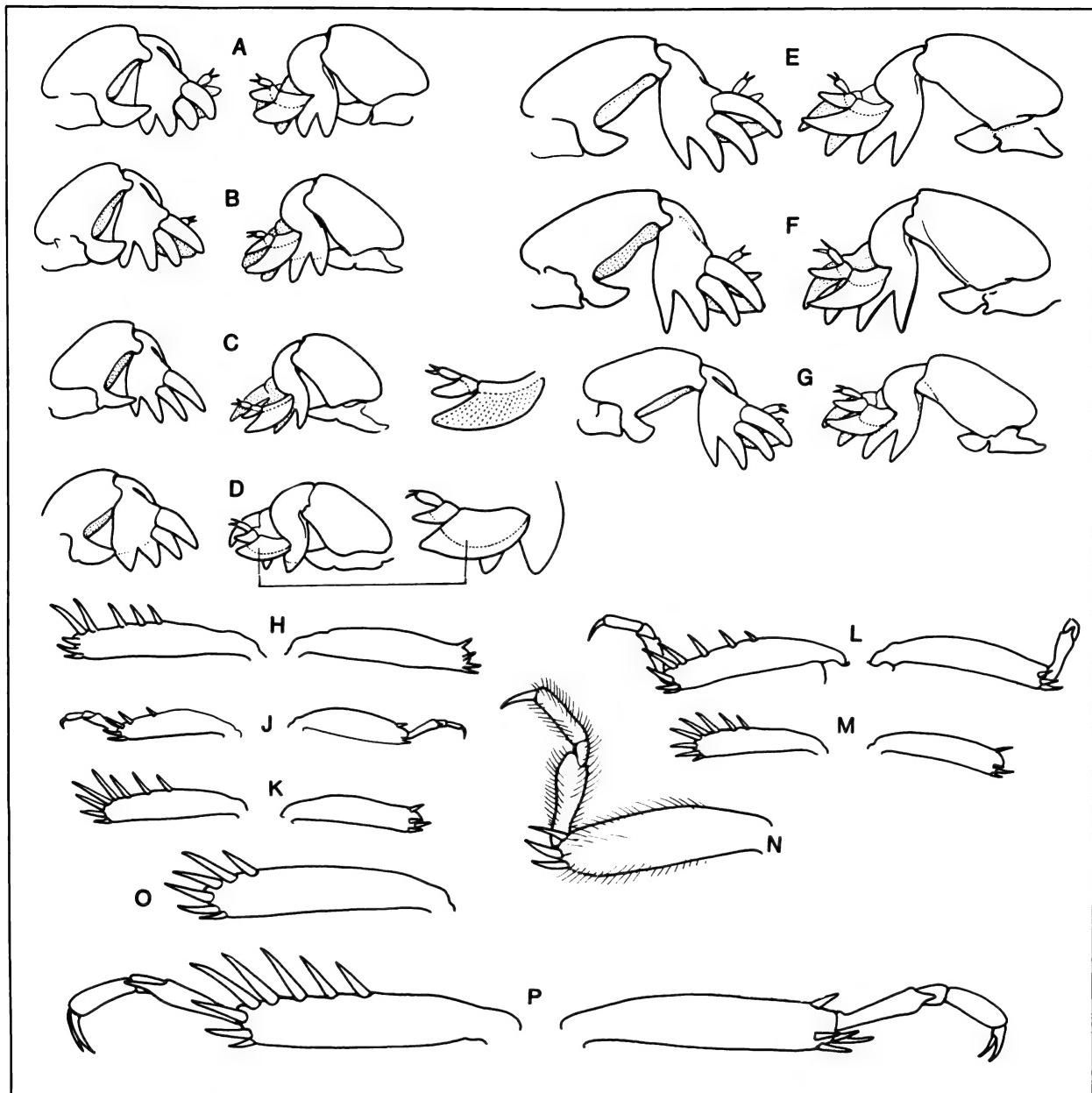


FIG. 354. *Gryllotalpa*. A–G, Leg I showing inner (left) and outer (right) faces: A, *monanka*; B, *coarctata*; C, *babinda*; D, *pilosipes*; E, *nitidula*; F, *pluvialis*; G, *australis*. H–P, tibia III showing inner (left) and outer (right) faces: H, *pluvialis*; J, *babinda*; K, *australis*; L, *nitidula*; M, *coarctata*; N, *pilosipes* (inner face); O, *monanka* (inner face); P, *monanka*.

***Gryllotalpa pluvialis* Mjöberg, Figs. 353G, 354FH, 355M**

Gryllotalpa pluvialis Mjöberg 1913: 30. Holotype ♀, Blackall Range, QLD (Mjöberg) SM.

Holotype female is pinned next to a male that on

general appearance and key characters seems to be conspecific, and it bears same labels. Male has body length of about 31.5 mm. Stridulatory file has 75 teeth, and two blank places near middle of file that would probably contain one and 3–4 teeth, respectively; 16.5 teeth per mm near break.

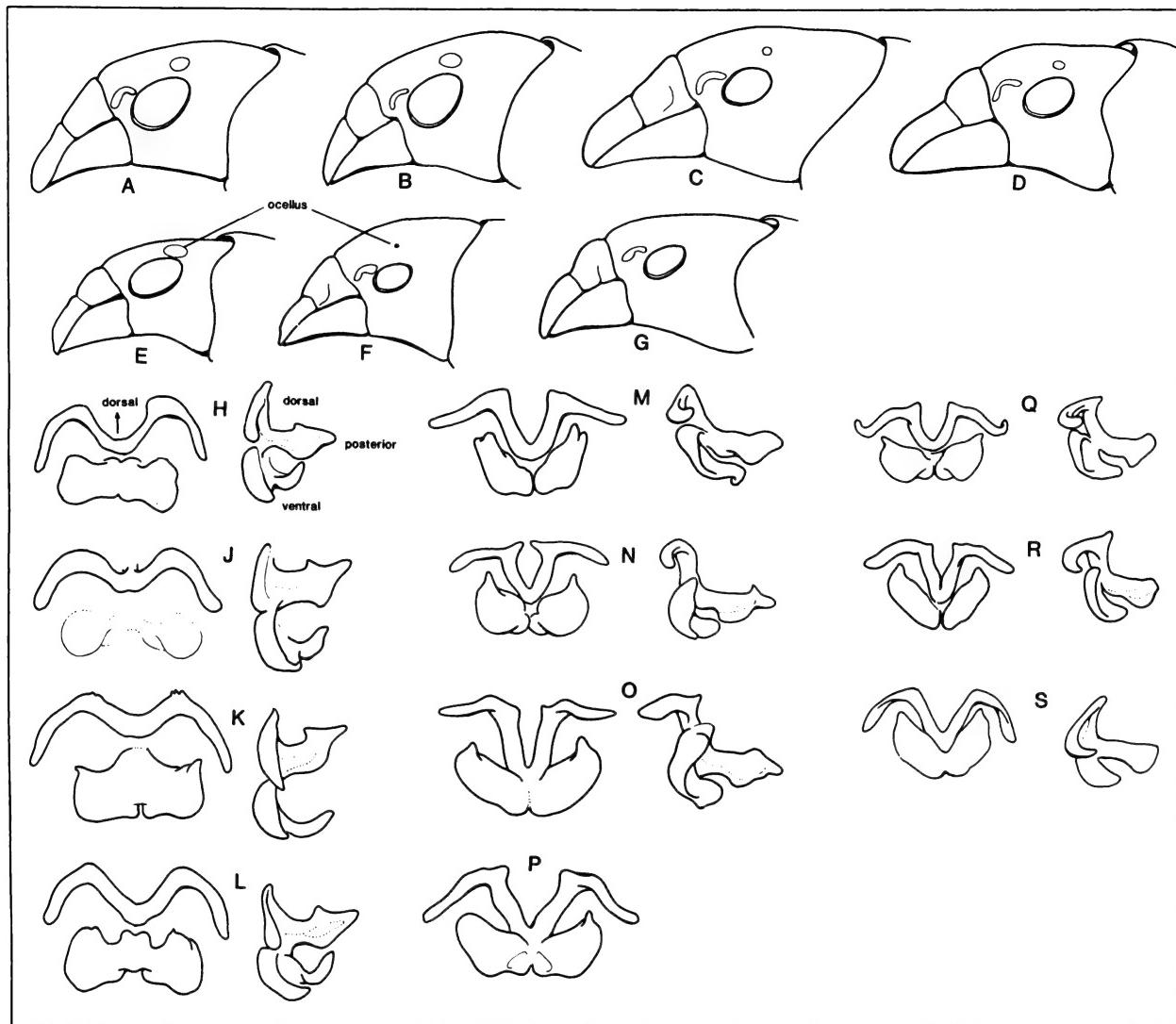


FIG. 355. *Gryllotalpa*. A–G, heads showing different sizes of ocelli. A, *monanka*; B, *coarctata*; C, *nitidula*; D, *australis*; E, *pilosipes*; F, *brachyptera*; G, *oya*. H–S, sclerotized hidden genitalia with two views, one looking from the front of the animal back towards the genitalia (left figure); the other is a lateral view (right figure): H, J, K, *monanka*; L, *coarctata*; M, *pluvialis*; N, *babinda*; O, P, *nitidula*; Q, R, *australis*; S, *brachyptera*.

The Stockholm male can be identified as conspecific with our specimens taken at several localities in northern Queensland by general appearance and structure of the stridulatory file. We assume that the female is conspecific.

RANGE. Eastern side of Great Dividing Range, QLD.

RECOGNITION. General color mahogany brown. Confusingly similar to *G. nitidula*. File with 75–80 teeth spaced at about 6/0.33 mm near center ($n=2$).

Teeth at center separated by less than one tooth's diameter. HW's not visible. Genitalia as in Fig. 355M. FW as in Fig. 355G. Body length ca. 32 mm; pronotal length ca. 10.5 mm; FW length ca. 11 mm; cerci ca. 14 mm; femur III ca. 9.0 mm; tibia III ca. 8.5 mm.

SONG. Fig. 350. Succession of low-pitched short chirps. No specimens collected at A-49, A-354, and A-538. Faster songs there may be of another species not yet collected.

		p/s	p/ch	ch/s	kps	°C
A-20	n=6	47.1-60	5-7	2.5-3.4	2.0-2.2	21
A-30		55.6	6-7	3.6	2.0	21
A-27		55	6	3.3-3.4	2.2	21
A-49*		83.4	6	5.6	1.5	21
A-354*		83.4	6	7.0	2.4	20
A-538* n=4		80-96	8-10	2.9-4.3	2.1	24
A-344		54.5	6-8	2.7	2.0	20

* Perhaps songs of species not yet collected.

HABITAT. Male taken while singing at dusk in sandy soil about 50 yards from confluence of Herbert River and Ripple Creek. Other males heard both in late afternoon and at night. The Mt. Spec female, while resembling the example male, may actually belong to an undescribed species. We heard no mole crickets during our visits to Mt. Spec. Males sing from burrow entrances in sandy soil, but not necessarily along the water's edge as with *G. monanka*.

SPECIMENS. Holotype ♀, ♂ same locality, sm. A-20 2♂ ANC. Mt. Spec, Paluma Range, QLD, 10 i 1968 (Brooks, Adams) 1♀ ANC.

***Gryllotalpa nitidula* Serville, Figs. 353H, 354EL, 355COP**

Gryllotalpa nitidula Serville 1839: 307. Holotype ♀, New Holland, PM.

Holotype macropterous; uniformly pale except head slightly darker than body; labrum and clypeus yellowish, lighter than rest of head; pronotum medium reddish-brown and very glossy, lacking pubescence; FW's extend three-fourths distance from rear border of pronotum to tip of abdomen; wings much longer, curling down between cerci; both antennae missing except for basal segment or two; left leg III missing except coxa and trochanter; right leg III missing except coxa; right tarsus II missing; right tegmen missing; abdomen broken, apparently glued back on, probably eaten out by dermestids; body length 32 mm; tegminal length, 14 mm; pronotal length 9.5 mm; pinned through pronotum; ocelli separated by about 4× their length.

The female cannot be positively identified, nor can the type locality. Labels on old specimens in European museums indicate that New Holland was used for both Australia and New Guinea. Until evidence to the contrary appears, however, it seems

easiest to retain this name for the southern species in this group, using the later name, *G. pluvialis* Mjöberg, for the northern species since the type locality for that name is known.

RANGE. Extreme southeastern NSW and southern VIC.

RECOGNITION. Head and pronotum smooth and shiny as in *G. pluvialis* but differing from that species in having fewer file teeth (51-68) spaced more widely (4/0.33 mm near center of file) (n=5). General color mahogany brown, darkest on face, pronotum, and dorsum of abdomen. FW's generally dark grey or brown; on dorsal field lightest in harp area; lateral field blackish dorsally and pale grey or brown along lower margin. FW's much like *G. australis* except harp area darkly pigmented in *G. nitidula* and usually light brown in *G. australis*. Male genitalia as in Fig. 355OP. FW venation as in Fig. 353H. Leg I as in Fig. 354EL. All 5 males examined had HW's hidden beneath FW's. Body length 30-35 mm; pronotal length 10-11.5 mm; FW length 10-11 mm.

Females: Both females examined, from Sydney area, have HW's extending well beyond end of abdomen and have shining, rusty-brown pronota. Dorsal field of FW's brownish but with pale longitudinal streaks running between longitudinal veins. Body length ca. 37 mm, pronotal length 11-12 mm; FW length ca. 17 mm. Teeth separated widely near center of file. This female also differs in bearing four subapical spurs on hind tibiae, arranged, 2, 1, 1 on right and 1, 1, 1, 1 on left; and in having narrower head, perhaps more prognathous. Three ANC specimens all macropterous.

SONG. Fig. 350. Loud clear trill unlike that of sibling species, *G. pluvialis*.

	p/s	kps	°C
A-352	18.2	2.4	20
A-428	17.0	2.2	21

HABITAT. Male at A-352 taken at dusk from sandy, forested hillside near ocean, probably old dune, when he and several others started singing about same time.

SPECIMENS. Holotype ♀ PM. A-315 1♂ ANC. A-352 1♂ ANC. A-428 1♂ ANC. Broulee, NSW, 3 iii 1978 (Key) 2♂ ANC. Concord West, Sydney area, NSW 21 viii 1950 (Dyce) 1♀ ANC.

OYA GROUP

At present we place *G. oya* in a distinct group characterized by short FW's and a lack of lateral ocelli. In wing length *G. oya* is similar to *G. brachyptera*, but the latter has a blackish abdomen, patterned FW's, and small lateral ocelli.

***Gryllotalpa oya* Tindale, Fig. 355G**

Gryllotalpa oya Tindale 1928: 7. Holotype ♂, Glenelg, SA, SAM.

Tindale says (p. 8): "The name chosen for this species is derived from the aboriginal name (Kaurna or Adelaide tribe) for species of the family. Crickets generally, including probably this species, formed items in the food supply of the natives."

RANGE. Southern SA to southwestern WA.

RECOGNITION. Distinguished from other mole crickets by its sparsely pubescent pronotum, FW's about $\frac{3}{5}$ length of pronotum, and absence of ocelli. Tindale (1928: 7-9) describes it in more detail, in-

cluding behavioral and life history notes. Several WA specimens of *G. oya* have pale band down center of pronotum; pronotum appears less pubescent than in SA specimens, with pubescence only anteriorly and laterally. In some specimens posterior ocelli represented by tiny pale spots that may or may not be functional visual organs.

SONG. Not known.

HABITAT. Lives "principally in sand or near the sea-beach. After showers have moistened the surface of the sandhills their lines of progress just beneath the ground are marked by broken tracks on the surface, and single individuals can generally be secured by digging along these indications" (Tindale 1928: 8).

SPECIMENS. Holotype ♂ SAM. The following specimens were seen in the WAM, additional data were not recorded: Freemantle, Gwalia, Cottesloe, North Perth, Victoria Park, Perth, Nedlands, Rottnest, Eneabba, Appletcross, Mt. Hawthorn, Joondanna, King's Park. The following localities were recorded in the SAM: Glenelg, Henley Beach, Port Elliott, Kangaroo Island.

SUBFAMILY MYRMECOPHILINAE

Genus *Myrmecophilus* Latreille

Myrmecophilus Latreille 1829: 183, Regne Anim. (2nd ed.). Type species: *Blatta acervorum* Panzer 1799: 68; Europe, by monotypy, according to Kirby 1906.

Sphaerium Charpentier 1825: 78, 79. Type species: *Blatta acervorum* Panzer 1799: 68.

This subfamily of tiny, wingless, hump-backed crickets restricted to ant nests currently includes two genera, one, *Myrmophilellus* Uvarov 1940, with a single species and known only from India, the other, *Myrmecophilus* Latreille, with 40 nominal species and essentially world-wide. Chopard (1968) lists *Myrmecophilus* species from Europe, North America, Colombia, North Africa, Crimea, Sicily, Greece, Asia Minor, Burma, Tunis, Malay Peninsula, Bitang, Hong Kong, and Honolulu. He includes four Australian species, one of which is *longitarsus* Chopard (1925: 298, Ann. Ent. Soc., France: N. Territ.), apparently accidentally omitted from his 1951 Australian monograph. Chopard described *longitarsus* from Koolpinyah the same year he described *mjöbergi* from Evelyn, Queensland,

but neither paper mentions the other species. The two species are alike with regard to the internal armature of the hind tibia, which is essentially all that is mentioned for *mjöbergi*. Without further information, *mjöbergi* seems best considered a synonym of *longitarsus*.

We are greatly indebted to Norman B. Tindale of the South Australian Museum, who turned over to us his drawings and notes on *Myrmecophilus*, from which we here describe a new species named in his honor. Dr. Tindale had begun a study of the Australian ant-loving crickets in the 1930's before he moved from entomology to ethnology in the South Australian Museum. A monograph on this group was to have followed his excellent paper on Australian mole crickets.

Myrmecophilinae are distinctive by their size and general appearance, their restriction to ant nests, their very broad hind femora, their reduced compound eyes, and the presence of a single row of movable spurs on the dorsal surface of the hind basitarsus. In a superficial way they resemble small

Mogoplistinae, and the tendency of many species of Mogoplistinae to inhabit surface trash further implies that the Myrmecophilinae may have diverged from the ancestors of that subfamily. The worldwide distribution of *Myrmecophilus* suggests a very ancient origin. Nothing is known of the means of transmission of myrmecophilines from one ant nest to another, raising interesting questions about the history and spread of the group.

Myrmecophilines lay a small number of very large eggs, nearly one-third the size of the adult insect (Schimmer 1909). Wheeler (1900) has described the behavior of an American species, *M. nebrascensis* Bruner.

Myrmecophilinae are not encountered often using collecting methods suitable for other Gryllidae, and we took only a single specimen under a desert plant near Stonehenge, Queensland, while searching for a species of *Ornebius*. We have less confidence in this group than in most that the nominal species actually represent evolutionarily separate breeding units. The significance of the characters used to distinguish them is not clear, and chances of significant environmental variations of discontinuous nature are great for insects living as hosts in the nests of different species of social insects.

We have examined about 150 juveniles and adults of this subfamily, all but a dozen or so in the collection of Norman Tindale (SAM). Except in the case of one quite distinctive group of specimens in that collection, we have largely followed previous nomenclature. All of the species, as we have designated them, are separable by the key characters. In describing new species, and in constructing the key, we have largely restricted our use of characters to the spurs of the hind tibiae and tarsi. We have no way of knowing whether the differences we describe actually characterize different species or complexes of similar species. *Myrmecophilus* species may vary considerably, especially in size, when they inhabit the nests of different ant species. This subfamily will probably be well understood only when its study is combined with a study of its host ants, perhaps including experimental transfers of crickets between hosts.

KEY TO *MYRMECOPHILUS* SPECIES

1. Hind tibiae with 7 spurs on internal margin, including 3 apical spurs; proximal spur shorter than next; basitar-

- sus with 4 non-apical dorsal spurs; body generally unicolorous brownish *longitarsus* and *mjöbergi*
- Hind tibiae with 5 or 6 spurs on internal margin, including 3 apical spurs; basitarsus with 3 dorsal non-apical spurs; otherwise not necessarily as above 2
- 2. Hind tibiae with 5 spurs on internal margin, the two proximal spurs similar in length and with their bases separated by about one spur length *australis*
- Hind tibiae with 6 spurs on internal margin; bases of the two proximal spurs separated by much less than length of proximal spur 3
- 3. Proximal spur on internal margin of hind tibia less than twice as long as second, bases of these two spurs separated by less than two-thirds the length of second spur *parachilnus*
- Proximal spur on internal margin of hind tibia about twice as long as second, bases of these two spurs separated by about the length of second spur or more 4
- 4. Body more or less unicolorous brown, hind femora pale brown or tan-colored *testaceus*
- Body blackish with 2 or 3 transverse whitish bands, hind femora whitish *tindalei*

Myrmecophilus longitarsus Chopard Fig. 357B

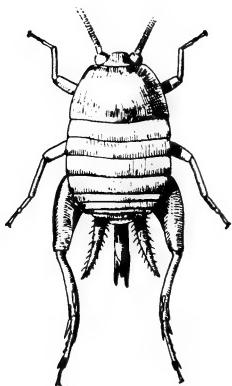
Myrmecophilus longitarsus Chopard 1925: 298. Holotype ♂, Koolpinyah, NT, nest of *Camponotus novae-hollandiae*, 6 iv 1915 (G. G. Hill) SM.

RANGE. Type locality in Darwin region of NT.

RECOGNITION. Chopard (1925: 298) gives the following description: "♂. Très petit, forme habituelle des espèces du genre, couleur très pâle. Tibias postérieurs (fig. 9) armés: au bord externe, d'une soie subspiniforme et l'épine assez longue (fig. 11); près de l'éperon supérieur, une seconde épine courte, semblant presque anormale; éperon supérieur très long, droit, moyen à peine moitié aussi long, un peu incurvé, inférieur spiniforme; armature interne (fig. 10) composée de 4 épines, la 1^{re} courte, 2^e assez longue, 3^e très courte, 4^e plus longue que la 2^e; éperon supérieur très long et un peu courbe, moyen dépassant la moitié du supérieur, inférieur spiniforme; metatarses très longs et grêles, portant 3 spinules au bord supérieur.

"Long. 2, 4 mm.; fem. post. 1, 4 mm.; tib. post. 0, 9 mm.; tarse post. 1, 1 mm.; cerques 1 mm.

"Cette espèce est remarquable par la présence d'une épine supplémentaire à l'apex du bord externe; la 1^{re} épine interne est éloignée de la seconde et l'éperon supérieur externe n'est pas renflé; le métatarses postérieur est particulièrement long et grêle. Ce dernier caractère se retrouve chez *M. australis* Tepp., qui en diffère par la taille plus grande

FIG. 356. *Myrmecophilus testaceus*.

et l'armature des tibias postérieurs qui ne compte que 2 épines au bord interne, 1 au bord externe, et l'éperon supérieur externe distinctement courbé."

HABITAT. Ant nests.

SPECIMENS. Holotype ♂ SM.

Myrmecophilus mjöbergi Chopard

Myrmecophilus mjöbergi Chopard 1925: 21. Holotype ♂, Evelyne, QLD, SM.

RANGE. Type locality in Evelyne, QLD.

RECOGNITION. Chopard (1925) gives the following description: "Taille et aspect du *M. australis*, mais en différant par les tibias postérieurs qui sont armés de 4 épines à la face interne, la 1^{re} courte, la 2^e et la 4^e longues, égales, la 3^e très courte (fig. 38); éperon supérieur interne renflé à la base et un peu courbé; metatarses très long. Long. 3 mm."

HABITAT. Ant nests.

SPECIMENS. Holotype ♂ SM.

Myrmecophilus australis Tepper Fig. 357D

Myrmecophilus australis Tepper 1896: 149. Holotype, under stones with ants, Mitcham, SA, 17 v 1896 (A. H. C. Lietz SAM).

RANGE. Known from the Adelaide region, SA.

RECOGNITION. Tepper (1896: 149) gives the following description of this species: "Male. Pale brownish-ochreous, ovate, flattened above, very thinly and minutely sericeous, head (except vertex), underside, and legs mostly whitish. Antennae slightly longer than the body, base subglobose, pale, scape brownish, hirsute. Eyes distinct, mi-

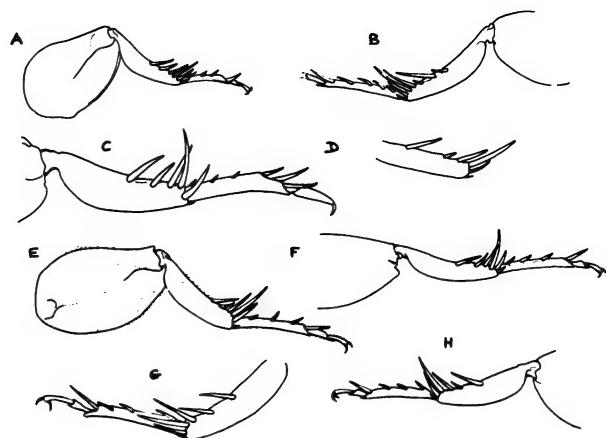


FIG. 357. *Myrmecophilus*. A, *parachilnus*; B, *longitarsus*; C, *parachilnus*; D, *australis*; E, *parachilnus*; F, *testaceus*; G, *parachilnus*; H, *tindalei*.

nute, oval, obliquely behind and external of antennae, covered by the margin of the pronotum, black.

"Pronotum subglobose, incrassated foremargin produced behind as a small acute tooth merging into the median line, ferruginous, disk pale, hindmargin fuscous, with narrow pale border. Mesonotum and metanotum, also abdominal dorsal segments, bordered darkly behind.

"Anterior and intermediary legs short and slender, hind legs about twice as long as the body, femora, tibiae and tarsi nearly subequal, in length, pale. Hind femora ovate, about twice as long than wide, externally very convex, with a small protuberance before the middle near the upper margin; inferior margin ciliate, ridges terminating by distinct teeth; apex truncated, with a small, circular depressed area (resembling a tympanum), immediately beneath the insertion of the tibiae, bearing a minute spinelet on its hindmargin (also present in the female but less perfectly); internal side of femora deeply concave.

"Hind tibiae slightly shorter than femora, subcompressed, upper margin concave, lower convex; lower external spur minute, straight, upper much larger, distinctly recurved; internal spurs very long, slightly decurved; upper margin with one external and two internal spines, ciliated.

"Hind tarsi longer than tibiae, very slender; first joint with three minute oblique spines and a longer terminal spur, second joint very short, third joint

very short, third joint extremely slender and claws most minute.

"Cerci about two-thirds of the length of the body, hirsute base thick, gradually tapering, apex acute, brownish ferruginous. Supra-anal lamina transverse, very short, rotundate, smooth.

"Female.—Resembling male, but larger and darker. Antennae more and base less incrassated. Eyes more prominent, less obtected. Abdomen wider posteriorly, darker above and beneath. Hind femora shorter and rather less robust. Supra-anal lamina subtrigonal, transverse; a fine groove on either side of the middle when alive. Ovipositor rather stout, nearly half the length of the body; subcylindrical, pale, slightly contracted in the middle; apex forming two parallel acute spines, dark brown."

	Male	Female
Length of body	3 mm.	4 mm.
Width of body	2 mm.	2-4 mm.
Length of hind legs	5-5 mm.	
Length of hind femora	2-2 mm.	2 mm.
Width of hind femora	1-5 mm.	1-3 mm.
Length of ovipositor		2 mm.

HABITAT. Hillsides, under stones with ants.

SPECIMENS. Males and females in SAM.

Myrmecophilus parachilnus n. sp. Fig. 357ACEG

RANGE. We have seen specimens from Flinders Range, Woodville, Auburn, Port Lincoln, Willalo via Hallett, and Adelaide, South Australia (SAM), and from near Stonehenge, Queensland (A-460). We also identified specimens taken by Barry Gray from a nest of *Myrmecia piliventris* at Nyngan, NSW (ANC).

RECOGNITION. Brown in color, distinguished by number and nature of spurs on margin of hind tibiae. Holotype pinned on left side of card with another male and female; any or all may be juveniles. Coloration pale brown; body length 2.48 mm; length of cercus, 0.98 mm. Body length of other specimens pinned with holotype, 2.48 mm and 2.29 mm.

Because the condition of the spurs on the hind tibiae seems to vary among the specimens we attribute to this species, we have illustrated four different tibiae (Fig. 357ACEG); perhaps several different species are involved.

HOLOTYPE. ♀, Parachilna, Flinders Range, SA (E. L. Savage) SAM.

HABITAT. Ant nests.

SPECIMENS. See RANGE.

Myrmecophilus testaceus Chopard Figs. 356, 357F

Myrmecophila testacea Chopard 1925: 20. Holotype ♀, Atherton, QLD (Mjöberg) SM.

RANGE. Taken by B. Gray in nests of *Myrmecia desertorum* at Hillston, NSW, and *M. brevinoda* at Miles and Banyabba, NSW (NIC). Chopard (1951) also lists Herberton, Queensland.

RECOGNITION. See Chopard (1925: 20). Body more or less unicolorous brown, femora III pale brown or tan colored. Proximal spur on inner margin of tibia III about twice as long as second spur, bases of these two spurs separated by about length of second spur or more. Hind tibiae with 6 spurs on inner face. Basitarsus with 3 dorsal nonapical spurs.

HABITAT. Nests of *Myrmecia desertorum*.

SPECIMENS. See RANGE.

Myrmecophilus tindalei n. sp. Fig. 357H

RANGE. Type locality in Perth, WA.

RECOGNITION. Internal tibial armature resembles that of *testaceus*, but color and size distinguish it from that species, and its color unlike that of any other Australian member of the subfamily. Body length, holotype, 1.73 mm; other individual, 1.64 mm. Coloration distinctive dark brownish to blackish dorsally, with hind margins of pronotum and mesonotum whitish, and central whitish region on hind margin of mesonotum.

HOLOTYPE. ♂, Swan River, Perth, WA, I 18806 (J. S. Clark) SAM.

HABITAT. Ant nests.

SPECIMENS. Holotype ♂ SAM.

DERIVATION OF GENERIC AND SPECIES NAMES

Abminga—snake trick; *adina*—swampy; *adyeri*—little; *agantra*—ornament; *alawara*—evening; *alkina*—moon; *allambi*—quiet place; *allara*—daylight; *allawara*—daylight; *allumba*—white bark eucalyptus; *alta*—daytime; *amarina*—rain; *aminya*—quiet; *ammonga*—insect; *anapina*—rain cloud; *anembo*—quiet place; *antakira*—southern; *apedos*—(Greek) flat; *aperta*—hill; *arpala*—moon; *ari-la*—ground, sand; *arilpa*—moon; *arima*—reed; *arinya*—kangaroo; *arita*—firm ground; *arowacka*—place with plenty of dingoes; *arupingi*—sand; *atalaia*—hollow sound; *atalumba*—Milky Way; *attunga*—high place; *bakali*—quick; *balamara*—morning star; *ballina*—fighting place; *baloo*—moon; *balumba*—rain; *balyaryta*—stopping place (balyartis Nambungia); *bambara*—forest country; *bandumu*—mangrove tree; *bangala*—hill; *barinya*—star; *belubula*—stony creek; *bengana*—earth; *biama*—great spirit; *bildabi*—waterhole; *bilo*—creek; *bimble*—earth; *binderi*—the stars; *binnali*—big; *binya*—mountain; *birubi*—Southern Cross; *bobo*—grass; *bogabilla*—rivers and swamps; *bookandrini*—scrub; *boora*—rock; *boreena*—shield; *borroloola*—Southern Cross; *buang*—Mt. Donna Buang; *bud-yara*—earth; *bullawarri*—big hills; *bundilla*—where waters join; *buntu*—rain; *camira*—the wind; *canara*—magpie; *caribong*—hill; *chidna*—track; *chindrina*—smooth; *choota*—gum tree; *cooma*—open country; *coomialla*—creek junction; *coorani*—Moreton Bay ash tree; *coorari*—stone; *coorumbena*—pretty place; *corroboree*—dance; *cowandilla*—curling waters; *dandiri*—saltbush; *dar-doana*—rainbow; *derrilin*—shooting star; *dirkanala*—hole; *dul-drana*—to dance; *dummal*—small; *dumpaal*—track, *eeboolaga*—fatigue; *elanora*—a camp by the sea; *elderra*—handsome; *elinya*—native grass; *ellerina*—plains and hills; *elvalina*—thick scrub place; *entrea*—song; *erola*—tree; *fabri*—little; *gagoor*—waterhole; *garro*—marsh; *gayandi*—spirit; *gidya*—small; *giliphi*—a star; *girra-long*—a star; *goobita*—small; *goondooloo*—Southern Cross; *goparinga*—dawn; *gorimu*—spinifex; *grong* *grong*—kookaburra; *gumbalera*—whirlwind; *gundialga*—good; *gurrinya*—white bark gum tree; *hillimunga*—shield; *iando*—visit; *iknurra*—big; *ilara*—mythical underground world; *iliari*—strange; *ilga*—quiet; *ilima*—to sing; *ilindi*—torch of lighted grass; *illalong*—swampy plain; *illaro*—track near the sea; *ilya*—open space; clearing; *immarna*—camp; *indiwarra*—many waterholes; *ingooralra*—evening; *iranda*—black cockatoo; *ita*—scrub; *iterala*—creek bank; *jabbarup*—plenty of grass; *jamberoo*—track; *jatalinga*—a bush; *jerilderie*—reedy swamp; *jerrima*—singing; *jillangolo*—mountain; *jirira*—northern; *joonaloon*—evening; *kaikai*—light colored; *kakirra*—moon; *kalara*—bushes; *kalimna*—beautiful; *kalyra*—timber; *kanandah*—where sun sets; *kantalpa*—grassy place; *kanya*—stone; *kanyaka*—place of the big boulder; *kapunda*—rocky waterhole; *karkalo*—evening; *karralla*—yellow; *karrawilya*—red gum; waterfall gully; *kattara*—distant; *kiah*—beautiful place; *killara*—always there; *kindyerra*—grass; *kira*—a star; *kirrimurra*—little; *kittani*—big mountain covered with scrub; *kiwani*—small; *kobar*—earth; *kulbina*—frog; *kulkawirra*—afternoon; *kurrabi*—gully; *kurringa*—rainbow; *lalwinya*—silent; *lara*—Milky Way; *larnoo*—camp; *leengil*—big; *lewara*—darkness; *liaweeda*—river; *likka*—the wind; *lilla*—gravel; *loorea*—moon; *lowanna*—beautiful; *mabanuri*—shooting star; *maiart*—darkness; *makatira*—firestick; *maltee*—night; *malu*—kangaroo; *mamoura*—legendary woman who lives in the sun; *manilla*—wind-ing river; *manmarra*—moonlight night; *mannena*—earth; *mantung*—white man's camp; *marika*—eastern; *marini*—red; *marnli*—ground; *maroa*—scrub country; *marooka*—good; *maroo*—black; *mataris*—rainbow; *meda*—blaze; *meekappa*—little; *merimbula*—place of large snakes; *merinda*—pretty woman; *merrina*—plenty of grass seed; *midgee*—small; *milkappa*—small; *milyaroo*—twilight; *minka*—cave; *minmirri*—quick; *miripara*—small; *mirra*—camp; *mirret*—earth; *mitanina*—earth; *monanka*—dark night; *moo-jerra*—stone; *moomoom*—ridges; *moordoolura*—flat; *morilla*—stony ridge; *mubboon*—stream; *munbilla*—plenty of water; *mundamunda*—ornament; *mundiwindi*—place name; *mungarina*—shy; *munga*—dusk; *muralappi*—small; *murwillumba*—camping place; *mu-witiwallin*—wakeful; *myara*—shooting star; *nakkara*—awake; *Nambung*—cave in Western Australia; *nangkita*—place of the little frogs; *narra*—black; *narranda*—fast; *natarina*—stranger; *ne-potinna*—solitary; *nilari*—dusk; *nillanilla*—mirage; *nimmitabel*—source of many streams; *ninbella*—beautiful; *nintenta*—lone; *noarana*—fearful; *noonamina*—sleeping camp; *noorundi*—darkness; *nullaga*—lagoon; *nundra*—striking; *nurndina*—clearing; *nur-roo*—black; *nyrang*—small; *oana*—speaking; *olebyra*—southern; *onya*—ghost; *ora*—bye and bye; *oradala*—firestick; *padiminka*—place of the witchetty grub; *palanu*—moon; *panaroo*—small; *pan-garinda*—sunset; *panimilli*—creek; *pankurla*—grass; *patawilya*—scrub; *peekarra*—grass; *pentaringa*—hills; *perrumba*—wattle blossom; *Pictor*—Southern Hemisphere constellation; *piki*—moon; *pilkena*—different; *pillinda*—hills with water; *pina*—big; *pindana*—desert; *pirra*—moon; *pitana*—flat country; *plurampe*—valley; *poene*—grass; *ponga*—heaven; *pulkara*—night; *pukabidni*—legendary giant; *pyala*—tree; *quabara*—ceremony; *quarriana*—parrot; *quinnia*—darkness; *riatta*—gum tree; *Specnia*—name alludes to place of discovery, Mt. Spec, QLD; *taitpulluna*—jumping; *takanna*—broad; *talia*—place near water; *taltantra*—grassy flat; *Tamborina*—genus named after Mt. Tamborine, S.E. Queensland; *tandanya*—home of big kangaroo; *tarcoola*—bend in river; *tarni*—salt water; *tarra*—creek; *tathra* and *tatiara*—beautiful country; *tau*—evening; *terba*—pretty; *tetyenna*—chirruping; *thankolomara*—island; *thetis*—sea (Latin); *thurgonalis*—rocky ground; *Tin-canita*—name alludes to the place of first discovery, Tin Can Bay; *tinga*—stone; *tingha*—flat; *tinkani*—nighttime; *tintinara*—sky; *titti-bong*—hard ground; *tjairaira*—twilight; *tooronga*—new; *Tozeria*—named after Mount Tozer, the type locality; *trawalla*—wild water; *tumbiumbi*—place of big trees; *tumpali*—cricket; *tundulla*—small; *turana*—rainbow; *ulandi*—a burning tree; *ulmarra*—bend in river; *Umbulgaria*—genus named after Wally Umbulgarrie who taught us how to use the didjeridoo; *unka*—spirit; *wanga*—hearing; *waninge*—ornament; *warra*—bad; *warrakara*—jumping; *warnani*—singing; *warratinna*—sky; *warriga*—galaxy; *warrilla*—singing; *weeronga*—silent; *weetapoona*—moonlight; *weta*—silent; *wilpari-na*—carried by the wind; *wilwindri*—mythical spirit who guides and guards at night; *wilyari*—scrub; *winbirra*—musical time beating; *wininaru*—deceit; *winnunga*—little; *wintrena*—great; *wirang*—gum tree; *wirkutta*—lively; *wirra*—scrub; *wirrininna*—silent; *wirrega*—forest; *wirrilla*—fast; *wittilliko*—to sing; *wombalano*—beautiful; *wookata*—valley; *woomba*—evening star; *woortooa*—grass; *worinta*—timber; *wotama*—quiet; *wurung*—large; *wyebo*—little;

wypanda-echo; *yabmanna*-scrub country; *yaraandoo*-Southern Cross; *yarandilla*-waterhole; *yarata*-coast; *yarea*-evening; *yarrami*-little creek; *yellena*-moon; *yelta*-small; *yerramutta*-grass; *yerriya*-evening; *yinbilliko*-kindling fire; *yindela*-the star

Venus; *yootha*-lucky; *yoothapina*-good luck; *yuluwirri*-rainbow; *yumbena*-ornament; *yungellus*-name alludes to the name Eungella Mountains; *yuraraba*-round mountain; *yurgama*-quick; *yurriyappa*-attentive.

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ISBN 978-1-4223-1928-4



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